



Public Sector Building Energy Benchmarking: Utility Data Access Options and Opportunities

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Primary authors of this report:

Brian Buckley, NEEP, Senior Policy Research and Analysis Associate

Charlie Taylor, NEEP, High Performance Buildings Research and Analysis Associate

Trevor Bossi, NEEP, High Performance Buildings Intern

For more information, please contact:

Charlie Taylor, NEEP, High Performance Buildings Research and Analysis Associate

ctaylor@neep.org, 781-860-9177 x 151

Carolyn Sarno Goldthwaite, NEEP, High Performance Buildings Senior Program Manager

cgoldthwaite@neep.org, 781-860-9177 x 119



About NEEP

NEEP was founded in 1996 as a non-profit whose mission is to serve the Northeast and Mid-Atlantic to accelerate energy efficiency as an essential part of demand-side solutions that enable a sustainable regional energy system. Our vision is that the region will fully embrace next generation energy efficiency as a core strategy to meet energy needs in a carbon-constrained world.

Disclaimer: NEEP verified the data used for this white paper to the best of our ability. This paper reflects the opinion and judgments of the NEEP staff and does not necessarily reflect those of NEEP Board members, NEEP Sponsors, or project participants and funders.

Executive Summary

Across the United States, an increasing number of building operators are engaging in building energy benchmarking, the practice of tracking an existing building's energy and water usage over time. The United States Environmental Protection Agency (EPA) estimates that over 40 percent of the commercial building stock has been benchmarked. These usage numbers are compared to previous measurements or modeled predictions for the building, or to the usage of other similar buildings. This process is a widely accepted first step toward reducing building energy usage, yet navigating a sea of bills and invoices spanning multiple utilities and fuel sources can be a time-consuming process not all building operators and facility managers are equipped to do. An assessment of the tools available and the policies and practices that promote building energy benchmarking reveals that efforts are underway to help streamline utility data access and encourage benchmarking for municipalities and other end users. Further, the prominence of public buildings within the community affords a unique opportunity for the public sector to lead by example and disseminate building energy conservation best practices – such as benchmarking – into the broader community.

This report surveys the current landscape of public sector building energy benchmarking policies and programs in the Northeast and Mid-Atlantic region. It examines the tools used to access utility data and how municipalities across the region are using them to track usage as part of building energy benchmarking mandates. The report then highlights municipalities that serve as exemplars for accessing and using data to guide energy management decisions. Finally, the report offers a series of observed best practices to help steer public entities and municipalities onto a path towards effectively implementing building energy benchmarking initiatives.

The Public Sector as an Exemplar

The public sector is uniquely positioned to lead by example through the implementation of energy benchmarking initiatives. Recently, several states and municipalities have taken steps to mandate the benchmarking and disclosure of public building energy usage. Large public sector building portfolios present tremendous energy savings opportunities, and in many cases progress can be driven from the top down through existing administrative structures. Public sector benchmarking policies can be used to demonstrate the value of energy efficiency measures to taxpayers, and prioritize upgrades when faced with budgetary constraints. While the public sector presents a unique opportunity for benchmarking energy usage, it continues to face obstacles, many of which are similar to those experienced in the private sector. The benchmarking process can be time consuming and labor intensive, but tools exist to streamline this process in a way that makes it more accessible to underfunded and understaffed state and municipal governments.

Tools Available for Streamlining Utility Data Access

The private sector offers options for municipalities seeking to understand their energy consumption patterns. Many utilities offer consolidated billing or electronic data interchange (EDI) options to deliver usage information



to their customers in a manner that facilitates analysis. Third-party vendors also offer data collection and analysis services to states and large municipalities who choose to outsource their utility bill management and/or benchmarking efforts. Some utilities offer energy usage data through Green Button, a standardized energy data format developed through an industry-led effort and supported by the National Institute of Standards & Technology, the US Department of Energy (US DOE), and others. The US EPA offers a standardized tool for the evaluation of energy data known as ENERGY STAR Portfolio Manager (“Portfolio Manager”).¹ Portfolio Manager offers a Data Exchange option, allowing participating utilities and other third parties to import energy usage data directly into Portfolio Manager for analysis. It also incorporates the Green Button standard as a method for downloading one’s energy usage data, with increasing operability planned in the coming year.

Observed Best Practices

As the region² looks for a path forward to efficiently access utility data in order to effectively implement building energy benchmarking mandates, several public sector benchmarking and data access best practices have begun to emerge. These practices include:

- Mandate state programs and incentivize municipal programs;
- Early stakeholder engagement;
- Leverage academic institutions as a resource;
- Institute cost recovery for Data Exchange Systems;
- Implement portfolio-wide Energy Management Systems (EMS) for states and large municipalities.

The section entitled “A Path to Public Sector Building Energy Benchmarking” presents a more robust discussion of these best practices.

Role of Market Actors

In addition to the observed best practices, there is a series of market actors who are essential in the push for streamlined access to utility data. These relevant parties are crucial to effectively proposing, establishing and implementing various elements of the observed best practices in order for utility data access to be streamlined for the public sector. These include:

- Public sector facility managers;
- Public sector officials;
- Academic and other non-governmental organizations;
- Regulators;
- Utilities.

The “Options for Streamlining Utility Data Access” section presents a series of actions these market actors can take and the benefits associated with them which serve as the building blocks for the observed best practices.

¹ ENERGY STAR Portfolio Manager is an online tool developed by the US Environmental Protection Agency that can be used to measure and track a building’s energy and water consumption, as well as greenhouse gas emissions.

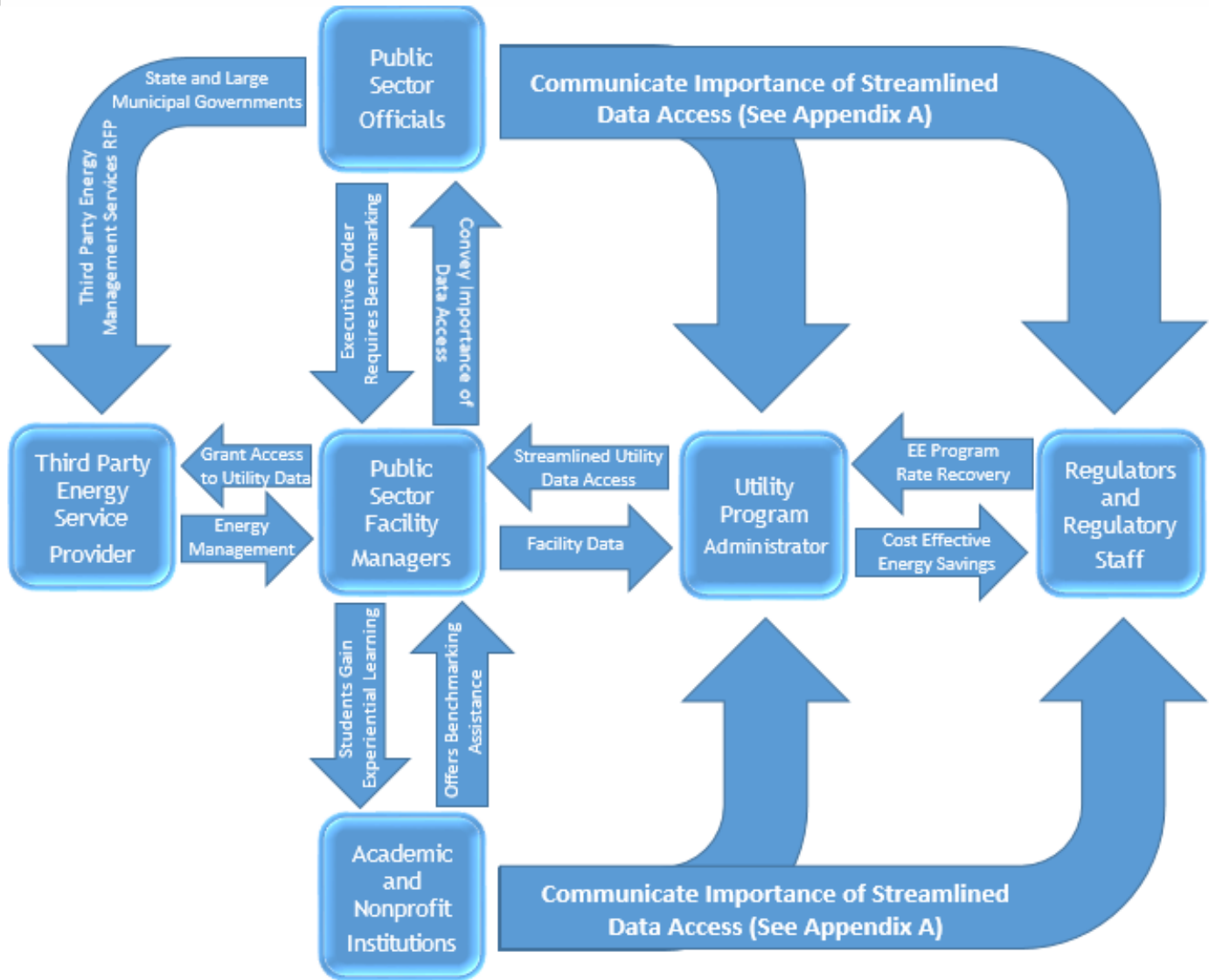
² The “region” constitutes the 11 states in the Northeast and Mid-Atlantic (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland), as well as the District of Columbia. However, many of this paper’s conclusions are drawn from and may be applicable to experiences outside the region as well.



OPTIONS FOR STREAMLINING UTILITY DATA ACCESS

Electronic Data Interchange (EDI)	<ul style="list-style-type: none"> • Format for electronic exchange of data between two parties. • Protocols have evolved so that format is no longer standardized, but rather unique to each utility. • Most utilities in restructured electric markets offer EDI. 	
Green Button	Region’s Utilities Offering Green Button “Download My Data”	
	<ul style="list-style-type: none"> • Baltimore Gas and Electric • Central Maine Power • Central Hudson • Consolidated Edison • Emera Maine 	<ul style="list-style-type: none"> • Efficiency Vermont (VT Utilities) • Eversource Energy • National Grid • Pepco Holdings • United Illuminating
EPA Portfolio Manager’s Data Exchange Web Services	Region’s Utilities Offering Data Exchange with US EPA’s Portfolio Manager via Web Services	
	<ul style="list-style-type: none"> • PECO/Veolia Energy • Baltimore Gas and Electric • Vermont Energy Investment Corporation <ul style="list-style-type: none"> • Advanced Programming Interface (API) that allows utilities and third party service providers to communicate energy data directly with the US EPA’s Portfolio Manager. 	
Third Party Data Collection and/or Analysis Services <small>(Not Utility Dependent)</small>	<ul style="list-style-type: none"> • States or large municipalities with the funding to do so can leverage assistance of a third party to collect, sort, check, and analyze building energy usage data. 	

Recommended Actions for Streamlining Utility Data Access





Building Energy Benchmarking

Building energy benchmarking efforts are a driving force behind the evolution of utility data access options.³ To understand the importance of streamlined utility data access in the context of building energy benchmarking, one must examine:

1. The building energy benchmarking process;
2. The benefits of building energy benchmarking;
3. The public sector's unique value proposition; and
4. The existing public sector building energy benchmarking efforts within the region.

The Building Energy Benchmarking Process

Streamlining utility data access can simplify the building energy benchmarking process by making it easier for building owners to access their energy usage data. Through traditional processes, data points must be collected from several different sources and organized in order to benchmark a building. This includes the collection of building square footage, occupancy, electric/gas/heating oil usage, and other fuel information (such as district steam or chilled water) for at least 12 full contiguous months (often requiring 13 months' invoices).

This data is then organized and input or uploaded into a tracking software, the most utilized of which is the US EPA's ENERGY STAR® Portfolio Manager ("Portfolio Manager").⁴ Portfolio Manager is a freely available online software tool that normalizes energy data inputs according to weather records and user-input building usage information, and generates a statement of performance detailing a building's Energy Use Intensity (EUI).⁵ Energy Use Intensity is the amount of energy used by a building per square foot each year, often expressed in kBtu/sf/yr. The EUI of a building can be used to compare it to other peer buildings, allowing a better understanding of relative overall building energy efficiency.⁶



Photo Credit: US EPA

For many common building types, Portfolio Manager also scores each uploaded building on a scale from 1-100, enabling building owners to compare their property to similar buildings nationwide. Those buildings achieving an ENERGY STAR score of 75 or higher are eligible for ENERGY STAR certification which demonstrates that a building has been verified by a licensed Professional Engineer or Registered

³ It's important to note that building energy benchmarking is only a component of a broader push to benchmark energy usage, both inside and outside of the building envelope (e.g. - gasoline, diesel fuel, outdoor lighting).

⁴ United States Environmental Protection Agency's ENERGY STAR Portfolio Manager. Accessed: 4/28/15. Available at: <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>

⁵ In this context, the term "normalized" means adjusting energy usage data to account for higher or lower heating and cooling requirements based on an individual year's weather relative to a recent historical average, or how the building would have performed had external climactic conditions been the same.

⁶ United States Environmental Protection Agency's ENERGYSTAR.gov website. *What is Energy Use Intensity (EUI)?* Accessed: 4/28/15. Available at: <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/what-energy>



Architect as performing among the top 25 percent of similar buildings nationwide. Studies show that ENERGY STAR certification provides value to building owners, as they achieve higher occupancy rates, rental prices, and sale prices per square foot than non-certified buildings.⁷ As of December 31, 2014, more than 400,000 buildings, or over 40 percent of the total US commercial building market, have been tracked using Portfolio Manager.⁸ Campaigns and incentive programs throughout the Northeast and Mid-Atlantic region expressly incorporate Portfolio Manager, including initiatives in Massachusetts, New Jersey, New York, Pennsylvania, and Maryland.⁹ Furthermore, building energy disclosure mandates in a number of jurisdictions in the region—as mentioned below—now require that buildings above certain size thresholds benchmark and report building energy use using Portfolio Manager – including Boston, MA; Cambridge, MA; New York, NY; Philadelphia, PA; Washington, DC; and Montgomery County, Maryland.¹⁰

Benefits of Building Energy Benchmarking

Benchmarking a building's energy and water usage carries many benefits. Tracking energy usage is an essential first step toward reducing energy consumption and associated costs. This is important because buildings are responsible for approximately 40 percent of global energy usage and related emissions.¹¹ Benchmarking provides building owners and managers with the information they need to make informed decisions about building system optimization or efficiency investment. An EPA analysis of 35,000 buildings that were consistently benchmarked over a four-year period found that energy savings averaged 2.4 percent per year.¹² Further, comparing a building's billed energy usage at varying points in time can help building owners detect clerical errors which may have resulted in higher than warranted energy bills.

The Public Sector's Unique Value Proposition

Public sector buildings hold unique opportunities to accelerate benchmarking policies. Large public sector building portfolios present tremendous savings opportunities, and in many cases progress can be driven from the top down through existing administrative structures. Public sector benchmarking policies can be used to demonstrate the value of energy efficiency measures to tax payers and prioritize upgrades when faced with budgetary constraints. Such policies can also lead markets toward transformation by building capacity in preparation for broader commercial building energy benchmarking policies. Yet, public building energy benchmarking policies continue to face obstacles, many of which are similar to those experienced in the commercial sector.

⁷ Miller, Norm (et. al). *Does Green Pay Off?* (July 2008). Accessed: 4/28/15. Available at: <http://www.usgbc.org/Docs/Archive/General/Docs5537.pdf>

⁸ United States Environmental Protection Agency. *Energy Use Benchmarking: Data Trends*. Accessed: 4/28/15. Available at: <http://www.energystar.gov/buildings/about-us/research-and-reports/portfolio-manager-datatrends>

⁹ United States Environmental Protection Agency's Energystar.gov. *"Campaigns and Incentive Programs that Incorporate ENERGYSTAR."* 4/28/15. Available at: <http://www.energystar.gov/buildings/program-administrators/state-and-local-governments/campaigns>

¹⁰ Institute for Market Transformation (IMT). *Building Energy Performance Policy*. Accessed: 4/28/15. Available at: <http://www.imt.org/policy/building-energy-performance-policy>

¹¹ United Nations Environmental Program (UNEP). *Buildings and Climate Change: Summary for Decision Makers*. (2009) Page 6. Accessed 4/28/15. Available at: <http://www.unep.org/sbci/pdfs/sbci-bccsummary.pdf>

¹² *Supra*, at [note 9](#).

Benchmarking and Portland, ME

The City of Portland, Maine benchmarks its public facilities on an annual basis. The information reveals seasonal variations in building use or performance and helps identify strategic opportunities for investment. Often, results lead to a review of a building's operations or long-term energy performance. For example, periodic benchmarking has revealed opportunities for switching fuels in the summer or changing operating procedures (operating hours, personnel policies, etc.) to save money.

Portland also uses benchmarking to target specific buildings for capital improvements based on potential performance opportunities such as oil to natural-gas boiler conversions that reduce costly fuel oil usage. Benchmarking data also provides the city confidence in estimating future utility costs, and can help identify efficiency rebate opportunities.



Photo Credit: City of Portland

Large Portfolios

The value of building energy benchmarking is especially evident in the public sector, where state agencies and municipalities often oversee large portfolios using substantial amounts of energy. Benchmarking energy usage in public buildings provides agencies, officials, and facilities managers with a better understanding of building operational costs than was previously available. This enables the more efficient allocation of taxpayer dollars towards strategic energy improvements which can provide a lifecycle return that surpasses other investment vehicles.

Top-Down Opportunities

The hierarchical nature of public sector administration provides a unique value-add in the context of building energy benchmarking. At the state and municipal levels, elected officials can drive policy from the top down in several ways. For example, they can direct facility managers to benchmark energy usage and institutionalize processes preserving such a mandate.

Outside their own portfolio, elected officials can also influence private actors and industries. State-owned buildings in aggregate are often one of the single largest energy consumers in a state.¹³ This position of leverage allows the public sector to influence the decision makers in the energy field. For example, the Commonwealth of Massachusetts partnered with utilities, a software developer, and municipalities in order to make energy usage data available to municipal officials for benchmarking purposes.¹⁴

¹³ Metropolitan Bay Transportation Authority. *About Sustainability*. (Stating that the "MBTA is the largest single consumer of electricity in the Commonwealth of Massachusetts.") Accessed: 4/28/15. Available at: http://www.mbta.com/about_the_mbta/environment/default.asp?id=26014

¹⁴ The result of this partnership was the Mass Energy Insight Platform, which is discussed in the "Exemplary Statewide Energy Data Tracking and Analysis Efforts within the Region" section.



Leading by Example

The public sector is uniquely positioned to lead by example through the implementation of energy benchmarking initiatives. Recently, several states and municipalities have taken steps to mandate the benchmarking and disclosure of public building energy usage (see the following section entitled “State Legislation or Municipal Ordinances”). If the private sector follows public sector leadership toward benchmarking and disclosure policies: (a) higher performing buildings or rental spaces become more attractive in the marketplace due to the visibility of their comparatively low operating costs; and (b) low-performing buildings would consider efficiency upgrades to remain competitive in an open marketplace. This creates a market mechanism to encourage energy efficiency by leveraging public sector leadership.

Better Buildings Initiative

The Better Buildings Initiative, launched by President Obama in 2011, is a broad, multi-strategy effort to improve the energy use of our nation’s commercial, industrial, residential, and public buildings by 20 percent over 10 years. Better Buildings harnesses public and private sector leadership, state and local policies, financing mechanisms, workforce development, and efforts to improve building energy information to meet that ambitious goal. Hundreds of organizations are currently partnering with the Energy Department and furthering four key strategic areas to accelerate investments in energy efficiency:

- Developing innovative replicable solutions with market leaders,
- Developing a skilled clean energy workforce,
- Making energy efficiency investment easier, and
- Leading by example in the federal government.¹⁵

Better Buildings Challenge

The Better Buildings Challenge is a voluntary leadership initiative that asks leading CEOs and executives of US commercial and manufacturing companies, universities, school districts, multifamily residential organizations, data centers, and state and local governments to make a public commitment to energy efficiency. Organizations that step up to the challenge publicly pledge to improve the energy intensity of their entire US portfolio by at least 20 percent by 2020, or within 10 years announce, initiate, and complete at least one showcase project and one implementation model.¹⁶ Participating partners in the Northeast and Mid-Atlantic include: Boston, MA; Huntington, NY; Philadelphia, PA; Pittsburgh, PA; Medford, MA; Rochester, NY; Worcester, MA; the Commonwealth of Massachusetts; the District of Columbia, the State of Delaware; the State of Maryland; the State of New York; and the State of Rhode Island.¹⁷

¹⁵ US Department of Energy. *About the Better Buildings Initiative*. Accessed 9/22/2016.

<https://betterbuildingssolutioncenter.energy.gov/about-better-buildings-initiative>

¹⁶ US Department of Energy. *Better Buildings Challenge Progress Update*. (Spring 2016) Available at:

<https://betterbuildingssolutioncenter.energy.gov/sites/default/files/news/attachments/2016%20Better%20Buildings%20Progress%20Update.pdf>

¹⁷ US Department of Energy. *Better Buildings Initiative: Partners A-Z*. Accessed 10/27/2016. Available at:

<https://betterbuildingssolutioncenter.energy.gov/partner-list-a-z>



Public Sector Barriers

While the public sector presents a unique opportunity for benchmarking energy usage, it also faces sizable barriers. Like the private sector, public sector entities often find themselves resource constrained. Further, states agencies and municipal governments must navigate a sea of bills and invoices spanning multiple utilities, fuel sources, outside records, and internal administrative structures before they can examine their full portfolio of energy usage data in a manner that facilitates analysis.¹⁸ In some cases, facility inventories are outdated or inaccurate, often with improperly assigned meters. In others, non-utility parties are responsible for recording an asset's energy usage information.¹⁹ In states where restructured electric markets have enabled competitive supply contracts, utilities may not have immediate access to the supplier charge on their bill. Conquering these obstacles, several states and municipalities throughout the region mandate or incentivize public building energy benchmarking.

Public Sector Benchmarking Efforts within the Region

States and municipalities have taken several different approaches to enact public building benchmarking policies.²⁰ These approaches include policies that are:

1. Mandated through legislation/ordinances;
2. Directed through an executive order; or
3. Voluntarily undertaken as part of a grant, initiative, programmatic commitment, or facility management best practice.

State Legislation or Municipal Ordinances

Policies enacted through state legislation or municipal ordinance can be highly effective. However, the successful passing and enactment of a law requires political capital and support amongst a broad group of stakeholders.

Jurisdictions throughout the region have seen success enacting ordinances that require public building energy benchmarking, often as the first step of a broader benchmarking and disclosure initiative that reaches commercial and multi-family buildings as well.²¹ At the city level, this includes: Cambridge,

¹⁸ Herrick, Lori (et.al.) US Department of Energy's Better Buildings Conference, *Best Practices in Streamlining Access to Energy Data*. (Stating that the City of Virginia Beach, VA (Pop. ~448,000) eliminated 12,000 paper invoices annually by switching to electronic data interchange from paper billing for energy usage data. Accessed: 4/28/15. Available at:

<http://www1.eere.energy.gov/buildings/betterbuildings/summit/documents/presentations/public/best-practices-in-streamlining-access-to-energy-data.pdf>

¹⁹ For example, a facility manager might record gallons of heating oil delivered or a fleet driver may be responsible for recording gallons of gasoline pumped.

²⁰ See Generally, NEEP's *Building Energy Benchmarking and Disclosure Policies in the Northeast and Mid-Atlantic*. Available at: <http://www.neep.org/building-energy-rating-and-disclosure-policies>

²¹ See www.BuildingRating.org for updates on the latest jurisdictions to embrace building rating.



MA;²² Boston, MA;²³ New York, NY;²⁴ Pittsburgh, PA²⁵; Portland, ME²⁶; Washington, DC;²⁷ and Philadelphia, PA²⁸ At the county level, Montgomery County, MD also requires benchmarking and disclosure of municipal, commercial, and multi-family buildings.²⁹

At the state level, two jurisdictions within our region have enacted legislation explicitly requiring public building benchmarking: Maryland and Connecticut. To facilitate data collection and analysis, Maryland solicits services from a third-party vendor, while Connecticut leverages an academic institution to aid compliance.

Maryland

Maryland's *State Building Energy Efficiency and Conservation Act* requires "each State agency...[to] conduct an analysis on each of the buildings under its jurisdiction of its gas and electric consumption and the cost of this consumption under the direction of the Maryland Energy Administration and in coordination with the Department of General Services."³⁰

To facilitate the benchmarking of state-owned buildings, the Maryland Department of General Services issued a competitive solicitation for energy management software and services. As a result of the solicitation, they chose a software called Energy CAP to analyze building energy usage, contracting with third party service provider BithEnergy for data collection and quality assurance.³¹

Connecticut

Connecticut Public Act No. 13-298 allows the state Department of Energy and Environmental Protection (DEEP) to benchmark all state-owned buildings.³² DEEP has established a State of Connecticut Master Account in Portfolio Manager to track statewide energy usage and usage reductions.³³ Eastern Connecticut State University's Institute for Sustainable Energy (ISE) helps facilitate coordination of benchmarking efforts and staffs a help-center providing technical assistance to municipalities, state

²² Cambridge, MA. Building Energy Usage Disclosure Ordinance. (July 2014) Accessed: 4/28/15. Available at: http://www.cambridgema.gov/~media/Files/CDD/Climate/Building%20Energy%20Use%20Disclosure%20Ordinance_20141106.ashx

²³ Boston, MA. Building Energy Reporting and Disclosure Ordinance (May 2013) Accessed: 4/28/15. Available at: http://www.cityofboston.gov/images_documents/Signed%20Ordinance_tcm3-38217.pdf

²⁴ New York, NY. Local Law 84. (December 2009) Accessed: 4/28/15. Available at: http://www.nyc.gov/html/planyc2030/downloads/pdf/l184of2009_benchmarking.pdf

²⁵ Pittsburgh, PA. Bill No. 2016-0829. (2016) Accessed 12/2/2016. Available at: <https://www.go-gba.org/wp-content/uploads/2016/10/Legislation-Text.pdf>

²⁶ Portland, ME. Order 67 16/17. Page 226. Accessed 12/2/2016. Available at: <http://me-portland.civicplus.com/AgendaCenter/ViewFile/Item/4277?fileID=18409>

²⁷ Washington D.C. Clean and Affordable Energy Act of 2008. (2008) Accessed: 4/28/15. Available at: <http://dcclims1.dccouncil.us/images/00001/20080819161530.pdf>

²⁸ Philadelphia, PA. BILL NO. 120428-A. (2012) Accessed: 4/28/15. Available at: <http://legislation.phila.gov/attachments/13351.pdf>

²⁹ Montgomery County, Maryland. Bill 2-14. (April 2014) Accessed: 4/28/15. Available at: http://www.montgomerycountymd.gov/COUNCIL/Resources/Files/bill/2014/20140422_2-14.pdf

³⁰ Maryland S.B. 267. *State Building Energy Efficiency and Conservation Act* (2006). Accessed: 4/28/15. Available at: <http://energy.maryland.gov/incentives/state-local/sbeeca/SB267.pdf>

³¹ EnergyCAP. *EmPOWERed to Save: Utility Data Enables State Government Stakeholders to Compete for Savings*. Available at: [http://cdn2.hubspot.net/hub/313940/file-501283463-pdf/Case_Studies_\(Final\)/EnergyCAP_CaseStudyMaryland.pdf?t=1417019236159](http://cdn2.hubspot.net/hub/313940/file-501283463-pdf/Case_Studies_(Final)/EnergyCAP_CaseStudyMaryland.pdf?t=1417019236159)

³² Connecticut Public Act No. 13-298, *An Act Concerning Implementation of Connecticut's Comprehensive Energy Strategy and Various Revisions to the Energy Statutes*. Page 73. Accessed: 4/28/15. Available at: <http://www.cga.ct.gov/2013/act/pa/pdf/2013PA-00298-R00HB-06360-PA.pdf>

³³ Connecticut Department of Energy and Environmental Protection. *Connecticut Lead by Example Portfolio Manager Master Account Instructions*. Accessed: 4/28/15. Available at: http://www.ct.gov/deep/lib/deep/energy/lbe/portfolio_mgr_instructions.pdf



agencies, schools, and nonprofits attempting to benchmark.³⁴ As of December 2014, ISE had facilitated the benchmarking of more than 700 municipal buildings and approximately 75 state agency buildings.³⁵

Executive Orders

An executive order is a declaration by the executive of a governing body that directs agencies under their authority to comply with a suggested action or policy. Conditioned upon the trustee model of representation, executive orders can be put in place by a proactive governor without the need for legislative action.³⁶ Within our region, governors from three states have issued executive orders requiring state building energy benchmarking: (1) Massachusetts;³⁷ (2) Delaware;³⁸ and (3) New York.³⁹ Outside the region Alabama,⁴⁰ Ohio,⁴¹ and Michigan⁴² have also enacted executive orders to benchmark public building energy usage.

Initiatives

Aside from legislation, ordinances, or executive orders, some jurisdictions benchmark their public buildings simply because it is cost-effective facility management and saves taxpayer dollars. A non-exhaustive selection of known public sector benchmarking initiatives is listed below:

- Public schools across Vermont have been benchmarked through the School Energy Management Program, which began in 1993.⁴³
- The Vermont Department of Buildings and General Services has benchmarked many state-owned public buildings.⁴⁴
- New Hampshire received funding under the American Recovery and Reinvestment Act to benchmark and address energy efficiency in many of its public schools.⁴⁵

³⁴ Eastern Connecticut State University Institute for Sustainable Energy. BenchmarkCT Support and Coordination. Accessed: 4/28/15. Available at: <http://www1.easternct.edu/sustainenergy/benchmarkct-support-and-coordination/>

³⁵ Email Correspondence between NEEP staff and Institute for Sustainable Energy Employee (December 11, 2014)

³⁶ The trustee model of representation is based upon the idea that elected officials should be allowed the autonomy to act in favor of the public good, with less consideration for the interests of specific constituencies.

³⁷ Massachusetts Governor Deval L. Patrick, Executive Order 484 (April 2009) Page 11. Accessed: 4/28/15. Available at: <http://www.mass.gov/anf/docs/dcam/dlforms/energy/energy-eo484-final.pdf>

³⁸ Delaware Governor Jack Markell, Executive Order 18 (February 2010) Accessed: 4/28/15. Available at: http://governor.delaware.gov/orders/exec_order_18.shtml. See also, Delaware Division of Facilities Management Website. Benchmarking and Tracking. Accessed: 4/28/15. Available at: <http://dfm.delaware.gov/enrgenv/bnchmrk.shtml>

³⁹ New York Governor Andrew Cuomo, Executive Order 88 (2012) Accessed: 4/28/15. Available at: <http://www.dec.ny.gov/energy/71363.html>

⁴⁰ Alabama Governor Robert Bentley, Executive Order 24. (November 2011) Page 1. Accessed: 4/28/15. Available at: <http://adeca.alabama.gov/Divisions/energy/Documents/State%20Energy%20Program%20docs/EO%2025.pdf>

⁴¹ Ohio Governor Ted Strickland, Executive Order 2007-02 (January 2007) Page 1. Accessed: 4/28/15. Available at: http://www.ngvpolicy.com/OH_EO_2007-02.pdf

⁴² Michigan Governor Jennifer Granholm, Executive Directive No. 2005-4 (November 2007) Accessed: 4/28/15. Available at: http://www.michigan.gov/formergovernors/0,4584,7-212-57648_36898-116177--,00.html

⁴³ Vermont Superintendents Association. *School Energy Management Program*. Accessed: 4/28/15. Available at: <http://www.vtvs.org/school-energy-management-program.php>

⁴⁴ Fourth Biennial Report of the Climate Neutral Working Group. (March 2011) Page 8. (Stating that “Benchmarking and/or recommendations for specific performance upgrades have been completed on all District Courthouses, Correctional Facilities, Capital Complex and Waterbury State Office Complex.” Accessed: 4/28/15. Available at: http://www.anr.state.vt.us/anr/climatechange/Pubs/CNWG4thBiennialReport_FINAL_3-18-11.pdf

⁴⁵ New Hampshire EnergySmart Schools Program. (Stating that the “Program is currently closed and no longer accepting data”) Accessed: 4/28/15. Available at: <http://www.nhschoolbenchmarking.com/>



Rhode Island received a grant from the US DOE to benchmark its state and municipal facilities under the Rhode Island Public Energy Partnership.⁴⁶ A key stakeholder in Rhode Island’s benchmarking efforts is the University of Rhode Island, which utilizes “Energy Fellows” to coordinate and facilitate benchmarking activities in Rhode Island municipalities.

Utility Data Access

Building energy benchmarking can be a time-consuming and labor intensive process, especially in the public sector.⁴⁷ Yet, tools exist to streamline these processes in a way that makes them more accessible to underfunded and understaffed state and municipal governments. To understand how to improve access to utility data, one must examine: (1) traditional methods of accessing utility data: and (2) options for streamlining utility data access.

Traditional Methods of Accessing Utility Data

Customers traditionally have access to most of their building energy usage data through line items that are available on a monthly paper bill.⁴⁸ While some utilities have moved to a web-based paperless model, this model is often based upon meter number or service address rather than aggregated on a per-customer basis. This means that a customer with multiple facilities in a single service area may need to enter a specific login for each facility.

Alternatively, consolidated billing is an option offered by some utilities meant to help users with multiple accounts easily access their information in an organized manner.⁴⁹ Yet, even in cases where a utility offers consolidated billing, users must still manually transfer data into benchmarking software. Although straightforward, the process is time-consuming and laden with potential for manual input errors.

Options for Streamlining Utility Data Access

Several options are available for streamlining utility data access,⁵⁰ many of which are depicted in the table below. With the exception of third-party services, the following options are only available to a customer whose utility has chosen to offer such services.

⁴⁶ See Generally, Rhode Island Officer of Energy Resources. *Rhode Island Public Energy Partnerships*. Accessed: 4/28/15. Available at: <http://www.neep.org/sites/default/files/resources/RIPEP%20Municipal%20Flyer.pdf>

⁴⁷ See the sub-section titled “Public Sector Barriers”

⁴⁸ Availability of recorded data for intermittent unregulated fuels (e.g. diesel for a generator) may be more limited.

⁴⁹ United States Environmental Protection Agency. *Utility Best Practice Guidance for Providing Business Customers with Energy Use and Cost Data*. Section 2-11. (November 2008) Accessed: 4/28/15. Available at: http://www.epa.gov/cleanenergy/documents/suca/utility_data_guidance.pdf.

⁵⁰ State and Local Solution Center (forthcoming). *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program*. U.S. Department of Energy, Weatherization and Intergovernmental Program Office.



Options for Streamlining Utility Data Access ^{51,52}	
Electronic Data Interchange	<ul style="list-style-type: none"> Standardized format for electronic exchange of data between two parties Evolved so that format is unique to each utility
Green Button “Download My Data”	<ul style="list-style-type: none"> Standardized XML format for download of energy data Characterized as a literal “green button” on utility’s website Developed in response to a White House call-to-action through an industry led effort with the support of the National Institute of Standards and Technology (NIST), and the US Department of Energy NOTE: Green Button “Connect My Data” allows utility customers to send their data directly to a third party for processing and energy consumption analysis. PECO is one of the few utilities that offers “Connect My Data” in the Northeast and Mid-Atlantic.
EPA’s Portfolio Manager Data Exchange Web Services	<ul style="list-style-type: none"> Application Programming Interface (API) that allows utilities and third party service providers to communicate energy data directly with the US EPA’s Portfolio Manager.
Third Party Data Collection and/or Analysis Services	<ul style="list-style-type: none"> State, municipality, or other building owner leverages assistance of third party to collect, sort, check, and analyze building energy usage data.

Electronic Data Interchange

A number of utilities in the Northeast and Mid-Atlantic have developed Electronic Data Interchange (EDI) capabilities.⁵³ EDI is a standardized format for the “electronic exchange of information between two entities using standard, machine [readable], structured data formats.”⁵⁴ The EDI data format is not limited to the realm of utility data access, and is instead a standard for many types of electronic bulk data transfers, including communications between utilities and retail electric suppliers in restructured markets. EDI is an important option because it contains all information from the utility invoice and allows third-party firms to accept utility data in a standardized electronic format for processing and

⁵¹ State and Local Solution Center (forthcoming). Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program. U.S. Department of Energy, Weatherization and Intergovernmental Program Office.

⁵² For a chart summarizing principal advantages and disadvantages of each utility data access method, see: Minnesota Department of Commerce: Division of Energy Resources. *Integrating Benchmarking into Utility Conservation Improvement Programs to Capture Greater Energy Savings*. (August 2014) Pages 31-32. Accessed: 4/28/15. Available at: <https://mn.gov/commerce/energy/images/55323-71145-Weidt2014Benchmarking.pdf>

⁵³ As of November 2014, Investor-Owned Utilities in the Northeast and Mid-Atlantic Offering EDI include: Allegheny Power and Gas; Baltimore Gas and Electric; Central Maine Power; Delmarva Power; Elkton Gas; Elizabethtown Gas; First Energy; Green Mountain Power; Jersey Central Power and Light; Met-Ed; Eversource; NYSEG; Penn Power; Pennsylvania Power and Light; PENELEC; PECO; Potomac Edison; Potomac Electric Power Co; PPL Utilities; Public Service Electric and Gas Corporation; Washington Gas; and West Penn Power (For references, see: <http://utilityaccounting.com/services-current>, [VT PSB EDI Standards](#), and [Central Maine Power EDI Standards](#))

⁵⁴ See Generally, New York Public Service Commission, Report of the New York EDI Collaborative, *Overview of EDI*. (June 1999) Page 2. Accessed: 4/28/15. Available at: <http://www.nyseg.com/MediaLibrary/2/5/Content%20Management/NYSEG/SuppliersPartners/PDFs%20and%20Docs/EDIOverview.pdf>



analysis on behalf of its customers.⁵⁵ Though, some observers note that EDI has now evolved to the point where its format has become individualized according to each utility, rather than standardized.⁵⁶

The main limitation of the EDI format is that the data sent by a utility cannot be directly uploaded into Portfolio Manager by the recipient, and instead requires quality control and input through use of a third-party software provider; costs of such a service to municipalities with 100 accounts or more is minimal.⁵⁷ Also, once a municipality chooses to receive its billing data via EDI, it may no longer receive paper bills from the utility.⁵⁸ Some municipalities requiring a paper bill for their records, may format the data as such and produce a hard copy of their own.

Green Button

The Green Button initiative is an industry-led effort in response to a White House call-to-action to improve accessibility of energy usage data for customers. The effort was launched in 2012 to provide a standardized electronic format for transferring energy consumption data and enjoys the support of the US DOE, the National Institute of Standards & Technology, the Smart Grid Interoperability Panel, and the Utility Communications Architecture International Users Group, amongst others.⁵⁹ In participating utility service areas, customers can download their data directly from their utility's website via a literal green button. A more user-friendly experience than EDI, the Green Button data is transmitted in XML spreadsheet format. Currently, Portfolio Manager users can download their data in Green Button format, and the EPA is working to streamline upload of green button formatted data.



⁵⁵ State and Local Solution Center. (forthcoming). *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program*. U.S. Department of Energy, Weatherization and Intergovernmental Program Office.

⁵⁶ Supra, at note 48. Page 6.

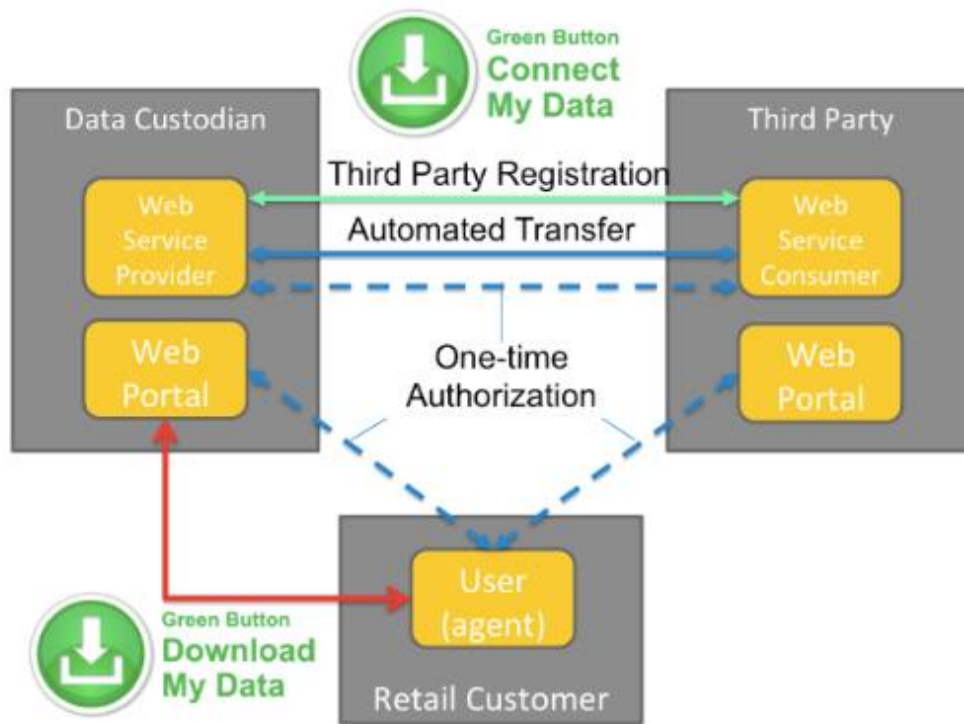
⁵⁷ State and Local Solution Center. (forthcoming). *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program*. U.S. Department of Energy, Weatherization and Intergovernmental Program Office.

⁵⁸ Ibid.

⁵⁹ Green Button Alliance. *About the Green Button Alliance*. Accessed: 4/28/15. Available at: <http://greenbuttonalliance.org/about/>



Some utilities also offer Green Button “Connect my Data” which allows consumers to consent to have their data transferred directly to a third party. This is done through a one-time authorization and includes automated data transfer as seen in the graphic below:



Source: www.greenbutton.org

At the time of this paper’s writing, PEPCO is the only utility in the region currently offering Green Button “Connect my Data”. A number of utilities have committed to offering “Connect my Data” or a standard with similar functionality. Con Edison, New York State Electric and Gas/Rochester Gas and Electric, Orange and Rockland, and National Grid in New York have all committed to implementing Green Button “Connect My Data” in combination with Advanced Metering Infrastructure (AMI) implementation plans⁶⁰.

Currently, over 100 million Americans can access their energy usage data through the Green Button format.⁶¹ Many utilities in the Northeast and Mid-Atlantic offer Green Button “Download My Data”, and several more have committed to providing it in the near future. The chart below provides a list of participating utilities in the region.

⁶⁰ State of New York Public Service Commission. CASE 14-M-0101 - Proceeding on Motion of the Commission in *Regard to Reforming the Energy Vision*. Page 155. (April 2016) Accessed: 7/15/16. Available at:

<http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7b81c7035c-b447-459a-8957-20bf3bdb6d0f%7d>

⁶¹ US Department of Energy. *Energy Department Launches Competition to Encourage the Creation of Innovative Energy Apps with Open Data*. (January 2014) Accessed: 4/28/15. Available at: <http://energy.gov/articles/energy-department-launches-competition-encourage-creation-innovative-energy-apps-built-open>

Green Button in the Northeast and Mid-Atlantic		
Utilities Offering Green Button Download My Data	<ul style="list-style-type: none"> Baltimore Gas and Electric Central Maine Power Central Hudson Consolidated Edison Emera Maine 	<ul style="list-style-type: none"> Efficiency Vermont (VT Utilities) Eversource Energy National Grid Pepco Holdings United Illuminating
Utilities Committed to Offering Green Button	<ul style="list-style-type: none"> NYSEG / RG&E Orange and Rockland PECO PPL Electric Utilities 	
Utilities Offering Green Button Connect My Data	<ul style="list-style-type: none"> Pepco (Washington D.C.) 	

While the initiative has had an impact on how some customers can access their data, there are still some concerns about data quality and consistency, including the need to manually clean and organize spreadsheets before they can be uploaded into Portfolio Manager.⁶² Utilities offering Green Button do not always provide standardized data sets. Further, a Green Button file may contain a number of data elements that are not consistent with Portfolio Manager, while also omitting data elements that are necessary for Portfolio Manager. Also, Green Button began as a resource for residential consumers, and has only recently been rolled out for the commercial sector.

Recently, Portfolio Manager added operability features that allow download of electricity use and cost data from Portfolio Manager in Green Button format. At this time, the only type of energy that users may download is electricity data (not natural gas, oil, etc.). Portfolio Manager does not currently offer the ability to upload Green Button files into its system, nor does it offer a Green Button “Connect My Data” operability. However, the US EPA is “actively monitoring the development of the Green Button standard and certification programs, and is exploring future opportunities to expand Portfolio Manager’s connections with Green Button data.”⁶³

The Lawrence Berkeley National Laboratory has developed the ***Building Energy Data Exchange Specification (BEDES) Data Dictionary*** which contains a common set of terms and definitions for building characteristics, efficiency measures, and energy use which can be used to support the analysis of the energy performance of buildings. This allows for greater consistency and reduced costs and time in sharing and aggregating data.



Source: LBNL

⁶² Email Correspondence between NEEP and Institute for Sustainable Communities staff (December 2014) (Stating that “Right now, you have to download the spreadsheet from Green Button, then copy the needed data out into PM’s format. While this is relatively easy for people who are computer savvy, most are turned off to this process as they aren’t sure of how to go about it, and don’t feel confident with the Excel work.”)

⁶³ US Environmental Protection Agency Support Article: *How Does Portfolio Manager Interact with Green Button Data?* Accessed: 4/28/15. Available at: <http://portfoliomanager.supportportal.com/link/portal/23002/23010/Article/36451/How-does-Portfolio-Manager-interact-with-Green-Button-data>



Green Button and Apps for Energy

During 2012 and again in 2014, the US DOE hosted a software development competition known as “Apps for Energy.” Apps for Energy contestants were challenged to develop software applications that interface directly with Green Button data to connect energy consumers with their usage habits in a manner that facilitates conservation. Winning applications can be found on Challenge Post.⁶⁴ Additionally, OpenEI.org hosts a number of other apps that communicate with Green Button, including 52 web-based apps and 14 mobile apps.⁶⁵

“NARUC encourages state public utility commissions...to consider a comprehensive benchmarking policy that includes...use of EPA ENERGY STAR automated benchmarking services.”

NARUC

Portfolio Manager Web Services Data Exchange

Portfolio Manager data exchange web services is an application programming interface⁶⁶ that allows utilities to automatically upload cost, consumption, and billing period data directly into EPA’s ENERGY STAR Portfolio Manager⁶⁷ platform on a routine basis (typically monthly) via software-to-software communication. To utilize this data exchange solution, an energy manager must first determine if utilities that service the organization’s portfolio are capable of exchanging data directly with Portfolio Manager.⁶⁸

Currently, there are 15 utilities nationwide that offer this service, with the majority located in California and Washington State. If a utility’s database is configured to exchange data with Portfolio Manager, the energy manager must create a new account or use an existing Portfolio Manager account to first add the utility as a contact, and then send a connection request to the utility. Upon agreement to the utility’s terms and conditions, the utility will accept the connection request. The energy manager may now share data exchange access to the property and commodity meter, and will also specify any service account or meter identification information as required by the utility. Up to 12 months of energy consumption and cost data are typically uploaded to the account each month.

In 2011, the National Association of Regulatory Utility Commissions (NARUC) issued a resolution in favor of automated benchmarking.⁶⁹ The National Association of State Utility Consumer Advocates (NASUCA)

⁶⁴ ChallengePost. Apps for Energy Submissions. Accessed: 4/28/15. Available at: <http://appsforenergy.challengepost.com/submissions>

⁶⁵ OpenEI.org. *Green Button Apps*. Accessed: 4/28/15. Available at: <http://en.openei.org/apps/?keyword=Green%20Button%20Apps>

⁶⁶ An application programming interface specifies how some software components should interact with each other.

⁶⁷ EPA’s Portfolio Manager is a free online energy management and tracking tool that calculates 1 – 100 ENERGY STAR scores for eligible commercial and institutional buildings, such as K-12 schools, office buildings, and many others. Portfolio Manager also allows you to track improvements over time, compare similar buildings within a portfolio, generate reports, and quantify greenhouse gas emissions. For training on how to use Portfolio Manager, visit http://www.energystar.gov/buildings/training?c=business.bus_internet_presentations.

⁶⁸ See [here](#) for full list of PM Web Services compatible utilities

⁶⁹ National Association of Regulatory Utility Commissions. *Resolution on Access to Whole-Building Energy Data and Automated Benchmarking*. (July 2011) Accessed: 4/28/15. Available at: <http://www.naruc.org/Resolutions/Resolution%20on%20Access%20to%20Whole-Building%20Energy%20Data%20and%20automated%20benchmarking.pdf>



has since issued a similar resolution.⁷⁰ Yet, few utilities in the Northeast and Mid-Atlantic offer data exchange with Portfolio Manager for their customers.

Two types of organizations typically utilize data exchange: (1) utilities, and (2) third-party data analysis firms.

Customers whose utilities offer automated data exchange typically must actuate the direct transfer of their utility data into Portfolio Manager.⁷¹ The customer must then also input other information (e.g. square footage, fuel oil, etc.) for an accurate analysis. California and Washington State legislatively require investor-owned utilities to provide data exchange services.⁷²

In instances where investor-owned utilities do not offer data exchange, customers can utilize a third party data analysis firm to facilitate data exchange. The third party firm will collect a customer's energy usage data from several sources, inputting data points into proprietary software which then exchanges data with Portfolio Manager.⁷³

A full listing of organizations that exchange data with Portfolio Manager via Web Services is available on the US EPA's website.⁷⁴ Three examples of utilities offering or planning to offer automated data exchange can be found in the region: PECO, Veolia Energy, and Baltimore Gas and Electric.

Better Buildings Energy Data Accelerator

As part of the President's Climate Action Plan,⁷⁵ the US DOE has expanded its Better Buildings initiative to engage leaders in a set of Better Buildings Accelerators designed to demonstrate specific innovative policies and approaches, which, upon successful demonstration, will accelerate investment in energy efficiency.⁷⁶ The Better Buildings Energy Data Accelerator was a two-year partnership which concluded

⁷⁰ National Association of State Utility Consumer Advocates. *Resolution Supporting Automated Benchmarking of Multifamily Buildings for Energy Efficiency Purposes*. (November 2013) Accessed: 4/28/15. Available at: <http://nasuca.org/2013-05-supporting-automated-benchmarking-of-multifamily-buildings-for-energy-efficiency-purposes/>

⁷¹ US Environmental Protection Agency. *Using Web Services to Exchange Data with Portfolio Manager*. Accessed: 4/28/15. Stating: "customers can request that you import their energy data directly into their Portfolio Manager accounts. This saves them time and lets them view and track ENERGY STAR scores in their Portfolio Manager account without the hassle of entering utility bill data every month." Available at: <http://www.energystar.gov/buildings/service-providers/service-and-product-providers/use-web-services-exchange-data-portfolio-manager>

⁷² RCW 19.27A.170 (Stating that "a qualifying utility shall upload the energy consumption data for the accounts specified by the owner for a building to the United States Environmental Protection Agency's ENERGYSTAR Portfolio Manager") Accessed: 4/28/15. Available at: <http://apps.leg.wa.gov/RCW/default.aspx?cite=19.27A.170>

⁷³ For more information, see the [Third Party Data Analysis Services](#) section.

⁷⁴ US Environmental Protection Agency. *Service Providers that Exchange Data with Portfolio Manager via Web Services*. Accessed: 4/28/15. Available at: <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/save-energy/expert-help/find-energy-star-service-a-0>

⁷⁵ Executive Office of the President. *The President's Climate Action Plan*. (June 2013) Page 10. Accessed: 4/28/15. Available at: <https://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>

⁷⁶ US Department of Energy. *Better Buildings Accelerators*. Accessed 9/22/2016. <https://betterbuildingssolutioncenter.energy.gov/accelerators>



in January 2016 and was established to identify best practices for sharing energy consumption data.⁷⁷ Through the initiative, local governments and utility partners agreed to implement a pilot program to “make whole building data available to at least 20 percent of multifamily and/or commercial buildings in the community,” sharing lessons learned with other accelerator participants.⁷⁸

Northeast Regional Better Buildings Data Accelerator Partners		
	Municipalities	Utilities
Successfully Launched Whole-Building Data Access Platform During Accelerator Timeline	<ul style="list-style-type: none"> • Boston, MA • Cambridge, MA • District of Columbia 	<ul style="list-style-type: none"> • Eversource • PEPSCO
Previously Developed a Platform, Supported Accelerator Participants Achieve Their Goals	<ul style="list-style-type: none"> • New York, NY • Philadelphia, PA 	<ul style="list-style-type: none"> • National Grid • PECO

Upon completion of the accelerator, the US DOE published a collection of resources entitled *Toolkit: Energy Data Access: Blueprint for Action*. This collection of case-studies, technical guidance, and best practices is a product of the work by accelerator city and utility partners to facilitate access to energy data for building owners. This strategic partnership led to the expansion of access to whole-building energy data by 18 utilities serving more than 2.6 million commercial customers nationwide.



Source: US DOE

Philadelphia

Two Philadelphia area utilities—PECO and Veolia Energy—offer automated data exchange with Portfolio Manager. While planning for implementation of a building energy rating and disclosure ordinance during summer 2012, the US DOE’s Philadelphia-based Energy Efficient Buildings Hub, in collaboration with the Pennsylvania Public Utility Commission, convened a Regional Data Management Working Group.⁷⁹ The group—which consisted of various stakeholders including utility regulators, federal agencies, policymakers, utility representatives, and buildings owners—identified key considerations and steps forward for utilities seeking to implement a data exchange portal.

⁷⁷ US Department of Energy. *Key Accomplishments and Results*. Accessed: 9/22/2016. Available at: https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Better%20Buildings%20Energy%20Data%20Accelerator%20Key%20Accomplishments%20and%20Results_1.pdf

⁷⁸ US Department of Energy. *Energy Data Accelerator Fact Sheet*. Available at: <https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/EnergyDataFactsheet.pdf>

⁷⁹ Krukowski, Andrea (et. al.) *IMT. Utilities’ Guide to Data Access for Building Benchmarking*. Page 6. (March 2013) Accessed: 4/28/15. Available at: http://research.cbei.psu.edu/media/files/IMT_Report_-_Utilities_Guide_-_March_2013.pdf



As a result of this collaborative process, Veolia Energy—which offers district energy services to more than 300 customers—now offers data exchange for its customers.⁸⁰

At the same time, PECO—which serves more than 1.6 million customers—reacted to stakeholder input by developing its Smart Energy Usage Data Tool, which allows building owners and operators to request energy usage data and exchange that data with Portfolio Manager. A municipality can then use the virtual meter option to consolidate several building meters owned by the municipality on a master account. PECO publishes a users’ guide on the web that details the exchange process and provides valuable insight on how a data exchange interface can be modeled.⁸¹

Baltimore Gas and Electric

In March 2015 Baltimore Gas and Electric (BG&E)—which serves more than 1.2 million customers—filed a request with the Maryland Public Utility Commission (PUC) to develop data exchange capabilities.⁸² Unlike the PECO tool, which was the result of a collaborative process driven by the implementation of a building energy rating and disclosure ordinance, the Maryland proposal was driven primarily by BG&E, who saw the program as a tool for meeting efficiency targets.⁸³

“BG&E forecasts initial costs of data exchange software implementation at \$178,000, and \$90,000 annually thereafter.”

Kimberly A. Curry

BG&E Legal Team

In May 2014, the Commission approved funding of the initiative through the state’s EmPOWER energy efficiency program.⁸⁴ The filing described the tools’ implementation costs as \$178,000, and continuing annual costs as \$90,000 thereafter. Continuing costs for the automated benchmarking program would account for less than 0.2 percent of BG&E’s \$50 million commercial and industrial program budget.⁸⁵ Focusing on commercial and industrial applications, this benchmarking tool will be applicable to municipalities whose facilities are typically classified within the commercial sector by most energy efficiency programs. Tracking the benefits of this program will be important, as other utilities

⁸⁰ Veolia Energy. *Automated Benchmarking Service Application and How To*. Accessed 12/10/14. Available at: http://www.veoliaenergyna.com/north-america-energy/ressources/documents/1/50071,Philadelphia-Benchmarking-Docs_Aut.pdf

⁸¹ Calico Energy Services. PECO Smart Energy Usage Data Tool. *Building Manager User Guide*. Accessed: 4/28/15. Available at: https://www.peco.com/Savings/ProgramsandRebates/Business/Documents/PSEUDT_User_Guide_.pdf

⁸² Testimony of Kimberly A. Curry to Maryland Public Service Commission. *Re: Case No. 9154—Automated Benchmarking Tool*. (March 2014) Accessed: 4/28/15. Available at: http://webapp.psc.state.md.us/Intranet/casenum/NewIndex3_VOpenFile.cfm?ServerFilePath=C:%5CCasenum%5C9100-9199%5C9154%5C%5C477.pdf

⁸³ Email Correspondence between NEEP and Maryland Energy Administration staff (October 2014) (Stating that “This was a response primarily to the efficiency targets and BGE seeing the need for the program. MEA and the Public Service Commission supported the program, but BGE proposed it independently of our suggestions.” And “Other utilities are waiting to see the results of the BGE program before proposing a similar tool.”)

⁸⁴ Maryland Public Utility Commission Order No. 86366. Accessed: 4/28/15. Available at: http://webapp.psc.state.md.us/Intranet/Casenum/NewIndex3_VOpenFile.cfm?ServerFilePath=C:%5CCaseNum%5C9100-9199%5C9153%5C487.pdf

⁸⁵ Public Service Commission of Maryland. *The EmPOWER Maryland Energy Efficiency Act Standard Report of 2014*. (March 2014) Page 20. Accessed: 4/28/15. Available at: <http://webapp.psc.state.md.us/intranet/Reports/2014%20EmPOWER%20Maryland%20Energy%20Efficiency%20Act%20Standard%20Report.PDF>



throughout the Maryland PUC service area are interested in examining BG&E's results before proposing similar programs of their own.⁸⁶

Utility Data Exchange and Cost Recovery

As stated above, the Maryland Public Utility Commission allowed BG&E to recover data exchange implementation costs through the state's demand side management (DSM) program. This example, and others, demonstrates a clear precedent for utility implementation of data exchange services. In fact, some experts suggest cost recovery may be available through varying avenues including DSM programs, utility base rates, or fee for service agreements.⁸⁷ If willing utilities can overcome concerns associated with cost recovery tests, as well as privacy concerns, millions of customers may soon have access to utility-facilitated data exchange.

Public Buildings and the Commercial Rate Class

As stated above, public buildings are often classified by utilities and regulators as within the broader "commercial" rate class. In some jurisdictions, DSM program incentives face strict cost-savings tests, for example, requiring that "a program [be] financed by the same customer class that will receive the direct energy and conservation benefits."⁸⁸ Accordingly, in some cases, a utility can only recover costs of data exchange for municipalities if the system applies to the broader commercial building rate-class as well.⁸⁹ Furthermore, development of data exchange systems often occurs in concert with building energy rating and disclosure mandates, which normally apply to the commercial sector as a whole rather than just municipal buildings, as is the case with building energy benchmarking ordinances, which are typically coined as public-private partnerships. In any case, a discussion of cost recovery requires discussion of concerns within the broader commercial sector, such as multi-tenant privacy issues.

Commercial Sector Multi-Tenant Privacy Concerns

If a utility implements a data exchange program that covers the entire commercial rate class, that tool would be accessible by owners of multi-tenant buildings, thereby raising obvious landlord-tenant privacy concerns. Providing building owners with *aggregated and anonymized whole building energy usage data* is becoming the accepted solution for these concerns.⁹⁰ In order to alleviate concerns in these scenarios, most utilities offering aggregated and anonymized data require tenant consent if a building has either: (1) a small number of tenants; or (2) one tenant uses a significant proportion of the building's energy.

⁸⁶ *Supra*, at note 74.

⁸⁷ State and Local Energy Efficiency Action Network. (2013). A Utility Regulator's Guide to Data Access for Commercial Building Energy Performance Benchmarking. Prepared by Andrew Schulte, ICF International. Pages 32-35. Accessed: 4/28/15. Available at: https://www4.eere.energy.gov/seeaction/system/files/documents/commercialbuildings_data_access_guide_0.pdf

⁸⁸ *Supra*, at note 70.

⁸⁹ Though, it's important to note that at least one utility (ComEd) has been able to recover data exchange implementation costs in a way that is not defined by sector, but rather through a broader "Market Transformation and Education" section of their efficiency plan. *id.* at page 27.

⁹⁰ See Generally, Wait, Wayne (et.al.). *A Case for Aggregate and Anonymized Whole Building Energy Data in the Multi-Family Sector*. Accessed: 4/28/15. Available at: http://www1.eere.energy.gov/buildings/betterbuildings/accelerators/documents/case_aggregate_anonymized_whole_building_energy_data_april_2014.pdf



For example, within our region Eversource Energy and National Grid stipulate that “[b]uildings with three or fewer tenants, or buildings where one tenant uses 50 percent or more of the energy, will need authorization from their tenants in order to use the data services.”⁹¹ Following the nomenclature used by other utilities facing the same question, this resolution would be called the 3-50 rule. Utility adherence to aggregation threshold standards is a key question for utility data access.⁹² The US DOE developed a chart summarizing aggregation thresholds applied to whole building data throughout the country (see below) and a statistical analysis of different aggregation thresholds for utility program staff to reference in the formulation of their data access protocols⁹³.

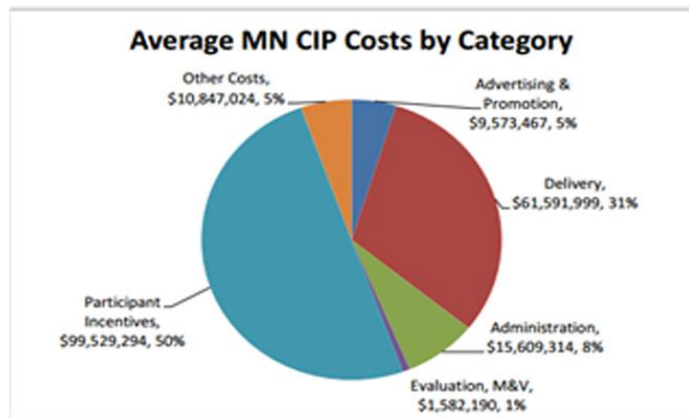
Utility Company (Service Territory)	Aggregation Thresholds
Austin Energy (Texas)	4/80%
Baltimore Gas & Electric (Maryland)	5
Clark Public Utilities (Washington)	2
Commonwealth Edison (Illinois)	4
Consolidated Edison (New York City)	2
Eversource (Boston & Cambridge, MA)	4/50%
National Grid (Boston, MA)	4/50%
National Grid (New York City)	4/50%
Pacific Power (Oregon)	5
Peoples Gas (Illinois)	5
Pepco (District of Columbia)	5
PSEG Long Island (New York City)	2
Puget Sound Energy (Washington)	5
Rocky Mountain Power (Utah)	5
Seattle City Light (Washington)	2
Xcel Energy (Minnesota, Colorado)	4/50%

Source: US DOE

Benchmarking Can Provide Value to Utilities and DSM Programs

In a world of rising DSM program baselines, utilities can draw value from widespread building energy benchmarking. Utilities facilitating building energy benchmarking through data exchange can use information and awareness provided by widespread benchmarking efforts to achieve energy efficiency resource standards. Data exchange can provide value for several aspects of a utility’s DSM program, including:

- Advertising and promotion;
- Measurement and verification; and
- Behavioral program delivery.



Source: The Weldt Group

⁹¹ City of Boston. *The Boston Energy Reporting How-to Guide*. (May 2014) Accessed: 4/28/15. Available at: http://www.cityofboston.gov/images_documents/Draft%20User%20Guide%203%2012%202015_tcm3-42713.pdf

⁹² California Public Utility Commission Decision 14-05-016, *Decision Adopting Rules to Provide Access to Energy Usage-Related Data While Protecting Privacy of Personal Data*. (May 2014) Accessed: 4/28/15. Available at: http://switchboard.nrdc.org/blogs/lettenson/CPUC%20Data%20Access%20Decision_May%2014%202014.pdf

⁹³ Livingston, OV (et.al.) Pacific Northwest National Laboratory. *Commercial Building Tenant Energy Usage Data Aggregation and Privacy*. (October 2014) Page 8. Accessed 4/28/15. Available at: http://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23786.pdf



Utility DSM Program budgets are generally composed of:⁹⁴

- Participant incentives;
- Program delivery;
- Administration;
- Advertising and promotion; and
- Evaluation, measurement, and verification.

The chart above provides a breakdown of average Minnesota Conservation Implementation Program (CIP) costs by category. CIP is the title of Minnesota’s commercial DSM program. According to estimates provided by the Weidt Group, costs of expanding the B3 Benchmarking tool to most of Minnesota’s commercial customers would equal less than five percent of current annual CIP advertising costs.⁹⁵

While this estimate may not extrapolate precisely to DSM programs in our region, it does provide a rough approximation of costs related to benchmarking within the context of broader DSM program budgets.

Advertising and Promotion

Utility-facilitated benchmarking services can contribute to a DSM program’s advertising and promotion strategies. Anecdotal evidence suggests as more utilities offer data exchange, more customers would engage in building energy benchmarking. If utilities had access to benchmarking data from the majority of commercial buildings in their geographic area, the data could be used to target DSM marketing efforts toward low performing buildings that likely offer the most cost-effective savings opportunities.⁹⁶ For example, the Massachusetts Department of Energy Resources plans to allow utilities to access data for targeted marketing toward specific high-energy users.⁹⁷

Additionally, DSM programs will likely see higher enrollment numbers if utilities can offer data exchange, lowering the burden-level of traditional benchmarking processes. For example, a California Energy Commission survey of building owners notes that “84 percent of those who benchmarked their buildings planned or implemented improvements linked to utility energy efficiency programs.”⁹⁸ Since building owners and facility managers with streamlined access to their energy usage data would be

⁹⁴ Supra, at note 48. Page 26.

⁹⁵ Supra, at note 48. Page 26. The Weidt Group estimates that B3 costs about \$750 per 1 million square feet of benchmarked building area annually (\$225,000 annually for 7,500 buildings/300 million square feet floor space). If expanded to all commercial buildings in the state, then it would cost ~\$500,000, or less than 5% of total CIP marketing costs.

⁹⁶ Krukowski, Andrea. Institute for Market Transformation. *Creating Value from Benchmarking: A Utility Perspective*. (August 2014) Page 9. Accessed: 4/28/15. Available at:

http://www.imt.org/uploads/resources/files/Creating_Value_From_Benchmarking_IMT.pdf

⁹⁷ United States Department of Energy. Better Buildings Challenge Webinar. *Best Practices in Energy Data Collection and Tracking*. Slide 51. Accessed: 4/28/15. Available at:

<http://www1.eere.energy.gov/buildings/betterbuildings/summit/documents/presentations/public/best-practices-in-streamlining-access-to-energy-data.pdf>

⁹⁸ Supra, at note 87 (citing: NMR Group (et.al.) *Statewide Benchmarking Process Evaluation*. Page 111. Accessed: 4/28/15. Available at: http://www.calmac.org/publications/Statewide_Benchmarking_Process_Evaluation_Report_CPU0055.pdf)



more likely to benchmark their buildings, the above study infers data exchange would drive more customers toward embracing DSM programs. Coincidentally, anecdotal evidence suggests that the increased transparency and streamlined utility interaction provided by data exchange improves the customer service experience, resulting in higher customer satisfaction levels.

Measurement and Verification

Utility data exchange implementation can contribute to a DSM program's evaluation, measurement, and verification.⁹⁹ For example, New Jersey¹⁰⁰ and New Hampshire¹⁰¹ both utilize pay-for-performance DSM programs that require savings verification. Benchmarking is an integral component of these DSM programs, which condition incentives upon verified energy savings. Data exchange would simplify the incentive process in these states, making it easier for approved partners and customers to verify savings. In some cases, benchmarking systems can be more cost-effective in calculating energy savings compared to traditional measurement and verification practices.¹⁰²

Behavioral Program Delivery

Utility data exchange implementation can contribute to a behavioral DSM strategy's program delivery.¹⁰³ In recent years, the residential sector has witnessed a surge in behavior-based DSM programs. Likewise the commercial sector is ripe for a similar surge.¹⁰⁴ For example, through energy performance data available in the State Energy Database, the Maryland Department of General Services (DGS) established a competition between state agencies to encourage energy conservation. As mentioned below in the section entitled "Maryland and State Energy Database", the DGS's investment in this database—paired with third party data services—has enabled such a competition.

⁹⁹ United States Environmental Protection Agency. *Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data*. (November 2008) Accessed: 4/28/15. Section 3-4. Available at:

http://www.epa.gov/cleanenergy/documents/suca/utility_data_guidance.pdf

¹⁰⁰ New Jersey Clean Energy Program. *Pay for Performance- Existing Buildings*. (Noting that "Pay for Performance takes advantage of the ENERGY STAR Program with *Portfolio Manager*," and that an approved partner must benchmark the building). Accessed: 4/28/15. Available at: <http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings>

¹⁰¹ New Hampshire Pay for Performance. *Getting Started*. (Stating that "The proposed work scope must project at least a 15% reduction in total facility source energy consumption, using EPA's *Portfolio Manager* benchmarking tool to set the baseline.") Accessed: 4/28/15. Available at: <http://nhp4p.com/getting-started/>

¹⁰² *Supra*, at [note 48](#) (stating that "Using a benchmarking system to calculate actual consumption savings for cases where the building improvement project is separately metered and has a savings estimate greater than 10 percent of its current energy consumption may be more cost effective than traditional evaluation measurement and verification practices)

¹⁰³ *Supra*, at [note 87](#).

¹⁰⁴ York, Dan (et.al.). American Council for an Energy Efficient Economy. *Frontier of Energy Efficiency: Next Generation Programs Reach for High Energy Savings*. Page 243-4. Accessed: 4/28/15. Available at: <http://web.mit.edu/cron/project/EESP-Cambridge/Articles/Program%20design/ACEEE%20-%20January%202013%20-%20Frontiers%20of%20Program%20Design%20copy.pdf>



Third-Party Data Analysis Services

As mentioned above, many third party vendors offer utility data analysis services. Such services often include the collection and verification of utility data, as well as non-utility data (square footage, fuel oil usage, etc.). This data can be gathered in several ways, including:¹⁰⁵

- Customer forwards invoices (accounts receivable sends a scan or fax);
- Customer consents to duplicate invoices, sent from utility to third party;
- Customer consents to third party's electronic access of utility data;
- Data acquisition hardware installed on existing meters or sub-meters; and
- Data acquired through a building automation system.

Third party data quality assurance and transfer protocols mentioned above can relieve in-house resource constraints. These services can be particularly useful for customers with large portfolios, such as state governments and large municipalities.¹⁰⁶

Many of these third parties use customized software that interfaces with Portfolio Manager through data exchange. One example of this is Minnesota's B3 Benchmarking tool, which was developed—and is currently administered by—the Weidt Group. Several other examples are mentioned in the “Exemplary Statewide Energy Data Tracking and Analysis Efforts within the Region” section.

The B3 Benchmarking Tool

The B3 Benchmarking tool was developed by the State of Minnesota through third party contractor the Weidt Group to track public building energy usage as part of the state's *Buildings, Benchmarking, and Beyond* (B3) initiative, pursuant to a 2001 law.¹⁰⁷ In Minnesota alone, the platform currently tracks over 7,500 buildings representing over 300 million square feet of space. Maintaining the system requires data collection spanning 22 state agencies, 410 cities, 55 counties, 60 higher education campuses, and 2,014 school districts.¹⁰⁸

The B3 tool is used to target candidates for retrofit and operational savings opportunities, as well as to provide measurement and verification after retrofits have been completed. To date, the tool has been used to identify over \$23 million in potential energy savings. Annual administrative costs total approximately \$225,000, or \$750 per million square feet of building space.¹⁰⁹ A unique value-add of the platform is its ability to compare “energy performance relative to a simulated reference building based on a specific standard, such as an energy code.”¹¹⁰ The platform also boasts a web portal (pictured

¹⁰⁵ *Supra*, at note 48.

¹⁰⁶ State and Local Solution Center. (forthcoming). *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program*. U.S. Department of Energy, Weatherization and Intergovernmental Program Office.

¹⁰⁷ McDougall, Tom. The Weidt Group. *Buildings Benchmarks and Beyond*. (June 2014) Accessed: 4/28/15. Available at: <http://www.nga.org/files/live/sites/NGA/files/pdf/2014/1406LBE LearningLab-McDougall.pdf>

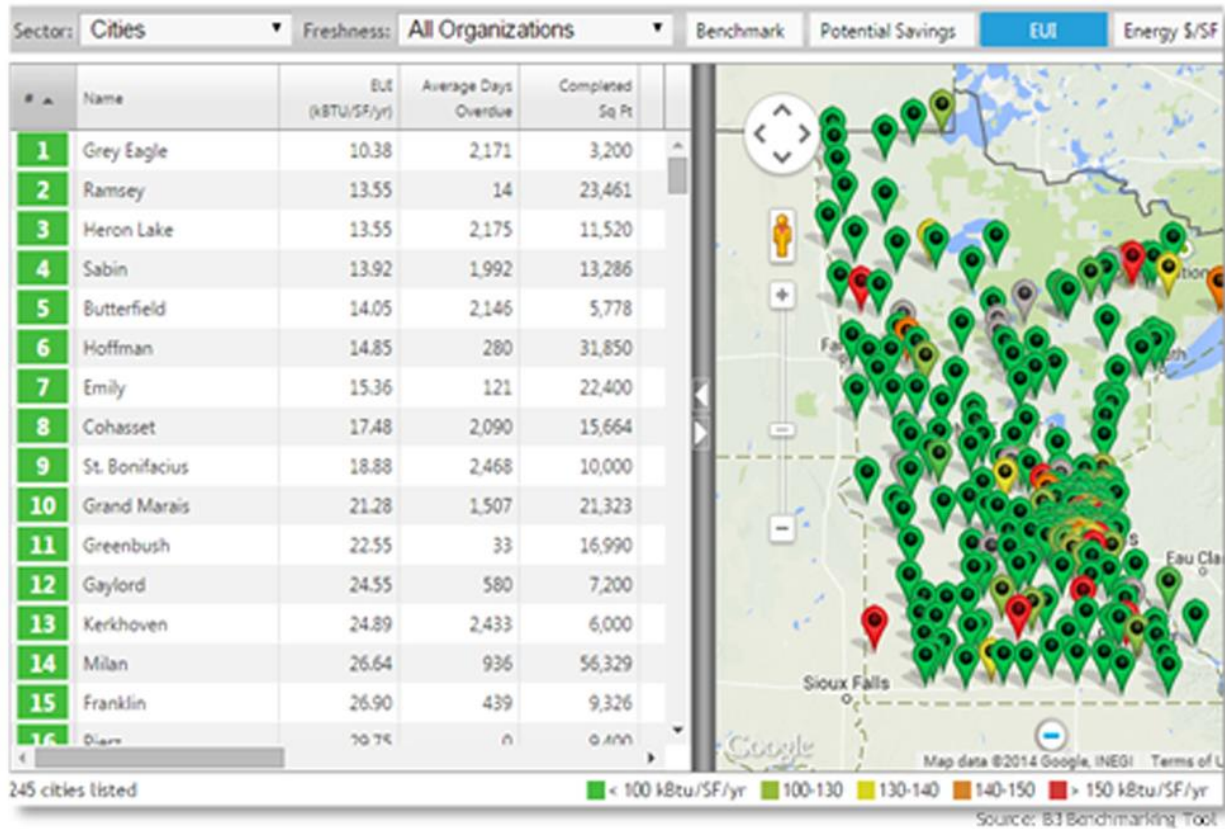
¹⁰⁸ *Supra*, at note 48, Page 16.

¹⁰⁹ *Supra*, at 48, Page 26 (Describing annual operating expenses as comprised of “help desk support, management, software system maintenance, occasional data requests, promotion, and training”)

¹¹⁰ *Supra*, at note 48, Page 30.



below) disclosing public building energy usage to build accountability and transparency around energy conservation.¹¹¹



The state of Minnesota granted the Weidt Group a license to the tool, which they have used for several years to help Iowa municipalities benchmark and disclose their public building energy usage.¹¹² In the private sector, Seattle's 2030 District is using B3 to benchmark and disclose building energy usage.¹¹³

¹¹¹ State of Minnesota B3 Benchmarking Rating and Disclosure System. Accessed: 4/28/15. Available at: <https://mn.b3benchmarking.com/Report.aspx?r=1>

¹¹² State of Iowa B3 Benchmarking Map. Accessed: 4/28/15. Available at: <https://ia.b3benchmarking.com/Report.aspx>

¹¹³ Seattle 2030 District B3 Benchmarking & FirstView™ Analysis (February 2014) Accessed: 4/28/15. Available at: http://2030districts.org/sites/default/files/seattle/2030_Presentation_Benchmarking_Report_01.11.14.pdf



Exemplary Statewide Energy Data Tracking and Analysis Efforts within the Region

Massachusetts

Massachusetts benchmarks state buildings and encourages municipal benchmarking through incentives provided in the Green Communities Act.

“We used [MEI] information to determine which buildings had the worst efficiency, and then we decided to prioritize those buildings with our grant funding.”
Laurie Connors
Millbury, MA Town Planner

MassEnergyInsight (MEI) for State Buildings

The Commonwealth of Massachusetts owns and operates 65 million square feet of buildings using 450,000 MWh of electricity annually.¹¹⁴ With thousands of utility accounts and multiple providers of liquid fuels, tracking energy use and savings is a complicated undertaking. Since 2010, the Commonwealth has relied on MassEnergyInsight, a web-based energy data collection, reporting, and analysis tool developed by Peregrine Energy Group. The Massachusetts Department of Energy Resources (DOER) expended \$747,070 for development and training sessions on the tool.¹¹⁵ Over 8,500 electric and gas

accounts are reported through MEI, providing a wealth of information about energy use throughout the Commonwealth’s building portfolio.¹¹⁶

Enterprise Energy Management System (EEMS)

To better understand energy savings opportunities within its largest buildings, the Commonwealth contracted for the installation of 1,300 real time meters in 470 buildings.¹¹⁷ Data provided by these meters is monitored through third party service provider EnerNOC’s energy intelligence software platform to identify energy savings opportunities as a part of a \$9.7 million contract. The program has been able to identify over \$2.2 million worth of annual operational savings alone in state buildings.¹¹⁸

Using EEMS, UMASS Lowell was able to identify operational alterations to their building management systems that will save \$45,000

¹¹⁴ Massachusetts Executive Office of Energy and Environmental Affairs. *Investments in State-Owned Buildings*. Accessed: 4/28/15. Available at: <http://www.mass.gov/eea/energy-utilities-clean-tech/resources-current-conditions/reinvestment-clean-energy/energy-recovery-dollars/investments-in-state-owned-buildings.html>

¹¹⁵ Massachusetts Department of Energy Resources. *EECBG Impact Evaluation*. (2013) Accessed: 9/22/2016. Available at: <http://www.mass.gov/eea/docs/doer/green-communities/pubs-reports/eeecbg-impact-evaluation-report.pdf>

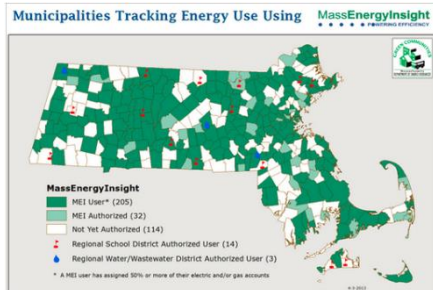
¹¹⁶ Massachusetts Department of Energy Resources. *Leading By Example: Towards Our Targets*. (October 2014) Accessed: 4/28/15. Available at: <http://www.mass.gov/eea/docs/eea/lbe/lbe-eeo484-report.pdf>

¹¹⁷ McCarey, Maggie (et.al) Massachusetts Department of Energy Resources. *Massachusetts Enterprise Energy Management System*. (February 2014). Accessed: 4/28/15. Available at: <http://energyoutlook.naseo.org/Data/Sites/3/presentations/McCarey-Rao.pdf>

¹¹⁸ *id.*



MassEnergyInsight and Green Communities



The Massachusetts Green Communities Act offers clean energy grants to municipalities conditioned upon a number of criteria, including the benchmarking of public facilities.¹¹⁹ Municipal benchmarking efforts also leverage the MassEnergyInsight (MEI) portal.¹²⁰ Peregrine has developed data interchange protocols with all of the state’s investor-owned utilities, and imports data for over 26,000 utility accounts each month. In addition, users can manually input non-utility data such as oil or propane usage and municipalities already using the EPA’s ENERGYSTAR Portfolio

Manager can harness MEI-Portfolio Manager integration for direct upload. Energy usage data can then be used to benchmark buildings and other facilities in each community against their performance at a different point in time, as well as against similar facilities within the state. This allows localities to understand their energy usage at the community level, monitor spending, discover equipment maintenance issues, and implement strategic efficiency investments.¹²¹ While this information is not published in its entirety, it is available to key officials tasked with implementing energy efficiency goals. To date, more than 260 municipalities have assigned 50 percent or more of their electric and/or gas accounts through the portal (municipalities pictured in green), consisting of more than 4,500 buildings or 8,000 facilities.¹²²

Building Asset Rating (BAR) Pilot

The Massachusetts Building Asset Rating (BAR) pilot¹²³ is a two-phase project that seeks to develop and test new methods for assessing the energy performance of a commercial building’s energy features that are cheaper and more easily comparable to other buildings. A joint project of NEEP and Massachusetts DOER, the BAR pilot focuses on analysis techniques that analyze a building’s physical energy assets rather than the operations of the building, serving as a complement to tools such as the EPA’s Portfolio Manager. As of the time of this writing, NEEP and DOER had completed Phase One of the pilot, a verification of the quality of these streamlined auditing techniques using a sample of buildings, and were finalizing the results from Phase Two, a refinement of the standardized protocols governing these audits over a 30 building sample. Along with its use as a tool to help drive strategic investment and retrofits in commercial buildings, this project also aims to forge a pathway for these streamlined audits to be used in accordance with building energy rating and disclosure ordinances. The final project report with findings from Phase Two is expected to be released in 2016.

¹¹⁹ Massachusetts Department of Energy Resources. Energy Reduction Plan Guidance and Outline. (July 2014) Accessed: 4/28/15. Available at: <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/guidance-criterion-3-spring-2012.doc>

¹²⁰ Massachusetts Department of Energy Resources Green Communities Division. *Mass Energy Insight User Guide*. (January 2013) Accessed: 4/28/15. Available at: http://www.massenergyinsight.net/mei/pdfs/MassEnergyInsight_User_Guide_FINAL.pdf

¹²¹ Massachusetts Department of Energy Resources Green Communities Division. *Mass Energy Insight: Overview of a Success*. (June 2012) (Containing Laurie Connors quote, at page 6) Accessed: 4/28/15. Available at: <http://www.mass.gov/eea/docs/doer/green-communities/mei/mei-2012-finalreport.pdf>

¹²² Powelka, Aimee, Massachusetts Department of Energy Resources. *“Massachusetts Green Communities: A Model Program for Energy Efficiency.”* Page 4. (August 2014) Accessed: 4/28/15. Available at: <http://www.mass.gov/eea/docs/doer/green-communities/pubs-reports/mass-green-communities-aceee-2014-powelka.pdf>

¹²³ Northeast Energy Efficiency Partnerships. *Building Asset Rating*. Available at: <http://www.neep.org/BuildingAssetRating>



Best Practices for Establishing a Robust and Sustainable Energy Data Management Program, available through the State and Local Solution Center.¹²⁸

New York and BuildSmartNY

New York state mandates benchmarking in state-owned buildings through Executive Order 88.¹²⁹ Establishing aggressive goals for reducing energy consumption in state-owned buildings, Executive Order 88 is the centerpiece of a broader program known as BuildSmartNY.

BuildsmartNY aims to reduce energy usage by 20 percent in the state's 16,000+ buildings by the year 2020.¹³⁰ To accomplish this goal, the order requires benchmarking of all buildings with an area greater than 20,000 square feet. Low-achieving buildings must then undergo an ASHRAE Level II audit to identify opportunities for improvement, as well as opportunities for cost-effective on site renewable generation. Contrasting this with the Building Asset Rating process mentioned above, an ASHRAE Level II audit requires detailed on-site equipment analysis and is often characterized as “investment grade”.

The New York Power Authority is tasked with administering the order through a Central Management and Implementation Team (CMIT). CMIT will use Portfolio Manager, but will seek to leverage additional benchmarking systems as they become available.¹³¹

New York's executive order is unique because it mandates installation of *sub-meters* at all buildings larger than 100,000 square feet. Currently, more than 90 percent of data for facility square footage is available only at the master metered level.¹³² The anticipated sub-meter data will soon be fed directly into the New York Power Authority's (NYPA) NYEnergyManager network operations center for analysis.

Located at SUNY Polytechnic institute in Albany, NY, NYEnergyManager is an energy management network operations center focused on improving energy efficiency in public buildings. It currently provides energy management and reporting for more than 3,000 public facilities, with the possibility of more on the horizon. Its software platform—developed by Talisen Technologies and administered by NYPA—will use interval meter and sub-meter data to paint a detailed picture of building energy savings opportunities, allowing identification of operational savings and demand response opportunities

¹²⁸ State and Local Solution Center, Weatherization and Intergovernmental Program Office, U.S. Department of Energy. Available at <http://energy.gov/eere/slsc/state-and-local-solution-center>

¹²⁹ *Supra*, at note 35.

¹³⁰ BuildSmartNY. *Baseline Energy Performance of New York State Government Buildings*. (August 2013) Page 2. Accessed: 4/28/15. Available at: <http://www.nypa.gov/BuildSmartNY/BaselineEnergyReport08-2013.pdf>

¹³¹ BuildSmartNY. *Executive Order 88 Guidelines*. Page 9. Accessed: 4/28/15. Available at: <http://www.nypa.gov/BuildSmartNY/Guidelines.pdf>

¹³² BuildSmartNY. *2013 Annual Progress Report*. Page 40. (January 2014) Accessed: 4/28/15. Available at: <http://www.nypa.gov/BuildSmartNY/BuildSmartNY-2013-Annual-Progress-Report.pdf>



(et.al.)¹³³ It is estimated that the NYEnergyManager program will save approximately \$25 million each year, or five percent of the state’s \$500 million energy bill.¹³⁴

District of Columbia and Build Smart DC

The District of Columbia’s *Clean Affordable Energy Act of 2008* required benchmarking of public facilities using Portfolio Manager, with results displayed publicly.¹³⁵ The Department of General Services (DGS) manages the District’s municipal building portfolio and is responsible for its implementation at municipal facilities. Until 2009, the District’s paper municipal utility bills were manually converted into spreadsheets; “15 file cabinets of monthly bills yielded a 1,400-row spreadsheet, accommodating over 1,400 meter accounts established by the utility for nearly 400 facilities.”¹³⁶

However, as part of the DGS’s 2013 *Game Change* initiative, the city partnered with local utility PECO, harnessing recently installed smart meters to receive 15-minute interval data “at little or no cost.”¹³⁷ At first, the District received this data via an API interface, but in October 2014 they became one of the first municipalities in the country to use the Green Button “Connect My Data” standard.¹³⁸ The District now displays the near-real-time electricity usage data from hundreds of buildings on the BuildSmartDC website.¹³⁹ Additional information on the District’s implementation of Green Button is available from the U.S. Department of Energy in the forthcoming guide on *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program*, which will be available through the State and Local Solution Center.¹⁴⁰

¹³³ Press Release: Governor Cuomo Announces State’s First Energy Management Network Operations Center to Improve Energy Efficiency in Public Facilities. (October 2014) Accessed: 4/28/15. Available at: <http://www.governor.ny.gov/news/governor-cuomo-announces-states-first-energy-management-network-operations-center-improve>

¹³⁴ Kennedy, Kit. Natural Resources Defense Council Switchboard. *New Operations Center to Help New York State Save Five Percent on Energy*. (October 2014) Accessed 4/28/15. Available at: http://switchboard.nrdc.org/blogs/kkenedy/new_operations_center_to_help.html

¹³⁵ *Supra*, at note 23.

¹³⁶ Gravely, Page. The District of Columbia: A Case Study for Implementing a Data Driven Approach for Sustaining Energy Consumption Reductions in Municipal-Owned Facilities. Page 17. Accessed: 4/28/15. Available at: http://dukespace.lib.duke.edu/dspace/bitstream/handle/10161/8149/PGravely_MP_Final.pdf?sequence=1

¹³⁷ Santiago, Philip. Association of Climate Change Officers. *District of Change—The Department of General Services Transforms DC into a Climate Powerhouse*. (February 2014) Accessed: 4/28/15. Available at: <http://www.accoonline.org/downloads/ACCO-CaseStudy-SamBrooks-Feb2014.pdf>

¹³⁸ Email Correspondence between NEEP Staff and DGS staff. (12/16/14). Process facilitated by *New City Energy*.

¹³⁹ BuildSmart DC. Building Directory. Accessed: 4/28/15. Available at: <http://www.buildsmartdc.com/buildings/>

¹⁴⁰ State and Local Solution Center, Weatherization and Intergovernmental Program Office, U.S. Department of Energy. Available at <http://energy.gov/eere/slsc/state-and-local-solution-center>



A Path to Public Sector Building Energy Benchmarking

Regional Best Practices

1. Mandating State Programs and Incentivizing Municipal Programs

Background:

Top-down public sector administrative structures can *and should* be leveraged to mandate building energy benchmarking in state-owned buildings. Legislation is one method of accomplishing this goal, but an even more important tool is the executive order- which needs no legislative approval for implementation. New York, Delaware, and Massachusetts have leveraged executive orders to mandate benchmarking in state-owned buildings without the need for legislative action.

Administrative structures surrounding municipal facility operation and maintenance are typically less centralized and structured than at the state level. However, state-level legislation can be used to incentivize building energy benchmarking and other municipal energy efficiency best practices. The success of the Massachusetts Green Communities Act in this capacity is a clear indicator that, under the right circumstances, incentives can be just as persuasive as mandates.

In Action:

- New York, Delaware, and Massachusetts have leveraged executive orders to mandate benchmarking in state-owned buildings without legislative action.
- Massachusetts uses statewide legislation to incentivize public sector building energy benchmarking and other energy efficiency best practices

2. Early Stakeholder Engagement

Background:

Early stakeholder engagement is a key tool in the collaborative process, and can be used to leverage outcomes that all affected actors can agree upon. This assertion rings true for public sector building energy benchmarking and utility data access discussions. For example, the Better Buildings Data Accelerator Partnership agreement¹⁴¹ explicitly requires a stakeholder engagement process to facilitate partnerships between the public and private sector. Further, lessons learned in Philadelphia and other cities across the nation seeking to benchmark and disclose building energy usage indicate that early stakeholder engagement can have a lasting effect on outcomes. Municipalities seeking to streamline utility data access should engage regulators, utilities, elected officials, and other jurisdictions early in the process to optimize outcomes.

¹⁴¹ US Department of Energy. *Energy Data Accelerator Fact Sheet*. Accessed 9/22/2016. Available at: <https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/EnergyDataFactsheet.pdf>



In Action:

- Lessons learned in Cambridge, Philadelphia, and other cities across the nation seeking to benchmark and disclose building energy usage indicate that early stakeholder engagement can have a lasting effect on outcomes. For example, Cambridge began engaging the business community, utility program administrators, and building owners long before attempting to enact a benchmarking and disclosure ordinance, and as a result saw very little opposition during the passage and implementation phase.

3. Leveraging Academic Institutions and Regional Nonprofit Organizations as a Resource

Background:

Academic institutions and other nonprofit organizations can be an important resource for municipalities planning to implement public sector benchmarking initiatives. Partnerships between academia and state energy officials can serve both parties equally. Students can gain valuable insight from fellowships and other opportunities in the energy field, while the state benefits by developing workforce capacity in a rapidly evolving sector.

For example, the Rhode Island Office of Energy Resources leverages the skillset of upper-classman at the University of Rhode Island—known as “Energy Fellows”—to facilitate public building benchmarking. Similarly, the Connecticut Department of Energy and Environmental Protection leverages Eastern Connecticut State University’s Institute for Sustainable Energy to facilitate benchmarking at municipal facilities throughout the state. In hopes of spurring innovation and workforce development, New York has located its NYEnergyManager facility within the College of Nanoscale Science and Engineering at SUNY Polytechnic Institute in Albany, NY. Partnerships like those in Connecticut, Rhode Island, and New York create value for all participants.

Outside the realm of academia, other nonprofit organizations can also serve as a resource to connect forward-thinking organizations with emerging talent in the energy efficiency field, in a way that benefits both parties. For example, the Environmental Defense Fund’s Climate Corps program connects participating organizations with fellows from the nation’s leading institutions to help them “find innovative ways to measure, analyze, and reduce organizational energy use.”¹⁴²

In Action:

- Rhode Island’s Energy Office leverages the skillset of upper-classman from the University of Rhode Island known as “Energy Fellows” to facilitate public building benchmarking. The Energy Fellows offer to walk municipalities through the process of identifying, sorting, and inputting data into the US EPA’s ENERGY STAR Portfolio Manager.
- Connecticut Department of Energy and Environmental Protection leverages Eastern Connecticut State University’s Institute for Sustainable Energy to facilitate benchmarking at municipal facilities throughout the state.
- New York has located its NYEnergyManager facility within the College of Nanoscale Science and Engineering at SUNY Polytechnic Institute in Albany, NY.
- The Environmental Defense Fund manages a Climate Corps program that connects participating organizations with emerging talent from the academic field to measure, analyze, and reduce organizational energy use.

¹⁴² Environmental Defense Fund. Climate Corps Projects. Available at: <http://edfclimatecorps.org/projects/results>



4. Cost Recovery for Data Exchange Systems

Background:

Investor-owned utilities throughout the region could develop Portfolio Manager Data Exchange capabilities, recovering their costs through demand side management program funding. PECO, BG&E, and other utilities around the country are demonstrating that Data Exchange systems provide value for utilities, demand side management programs, and ratepayers. It is likely that as more cities push for implementation of building energy usage disclosure ordinances, the value provided by data exchange services will become even more apparent.¹⁴³

Municipal facility managers could leverage such data exchange capabilities to reduce burdensome and error-prone data input processes. Municipalities seeking assistance with data quality control—or a more detailed level of analysis than provided by Portfolio Manager—should consider contracting with a third party for energy management services.

In Action:

- Utility data exchange with Portfolio Manager—formerly known as “automated benchmarking” and now known as Web Service—can ease the administrative burden and data quality concerns associated with manual input of meter data by resource constrained municipal officials, resulting in greater customer satisfaction.
- Investor-owned utilities throughout the region could develop Portfolio Manager Data Exchange capabilities, recovering their costs through demand side management (DSM) program funding.
- Data exchange systems may facilitate DSM advertising and promotion, measurement and verification, and behavioral program delivery.
- Facilitating implementation of a building energy rating and disclosure ordinance, PECO and Veolia were the first utilities in our region to offer automated data exchange with Portfolio Manager to commercial and municipal customers. Baltimore Gas and Electric recently recovered their costs for data exchange implementation through their demand side management program funding.

5. Portfolio-Wide Energy Management Systems for State and Municipal Buildings

Background:

Portfolio-wide energy management systems can provide savings at the state or local government level. From commodity purchasing strategies to coordinated demand response, state and local governments can save taxpayers millions of dollars by leveraging energy data. Advanced metering infrastructure and other data-driven technologies are changing the way energy is managed. States like New York, Massachusetts, and Maryland are leveraging leadership and collaboration to implement portfolio-wide energy management systems that drive energy savings, save taxpayer dollars, build workforce capacity, and drive the industries of tomorrow to *their* state capitals.

In Action:

- In New York, Massachusetts, Maryland, and Washington DC, advanced metering infrastructure and other data-driven technologies are changing the way energy is managed. Portfolio-wide energy management systems can provide millions of dollars in savings to states and large municipalities. For example:

¹⁴³ For a current map of such disclosure initiatives, see www.Buildingrating.org



- New York’s Energy Manager Program is projected to save approximately \$25 million annually, or five percent of the state’s \$500 million energy bill.
- Massachusetts’s Enterprise Energy Management system has identified over \$2.2 million worth of state building operational savings alone.
- Analysis through Maryland’s Energy CAP platform identified a \$91,000 billing error.

Roles & Responsibilities

Public Sector Facility Managers

<ul style="list-style-type: none"> ● Action: Consider alignment with academic institutions or nonprofit organizations for assistance tracking utility data. State entities and large cities should consider contracting with a third party for energy management services. ● Action: Benchmark public sector buildings and implement building energy retrofits. ● Action: Communicate to public officials: (1) the cost-benefit proposition of building energy benchmarking; and (2) the labor savings and manual input error eliminated by streamlined data access methods. 	<p>Benefit: Recognition for exemplary facility operation at reduced costs</p>
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Public Sector Officials

<ul style="list-style-type: none"> ● Action: Communicate the value of benchmarking to utility representatives, state energy offices, and regulatory staff. Appendix A provides a draft outreach letter for regulatory and efficiency program administrator staff. ● Action: Consider appointing an energy manager whose sole responsibility is to ensure that energy management best practices are ingrained in the core operating policies of the municipality. 	<p>Benefit: Improved budgetary capacity due to best practice building operation and maintenance that can now be allocated toward energy management, resulting in further benefits.</p>
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Academic and other Non-Governmental Organizations

<ul style="list-style-type: none"> ● Action: Consider establishing partnerships with municipal and state governments where students can aid facility managers in the tracking and analysis of utility data, providing training and data entry services. ● Action: Consider action to organize a unified voice for municipal and state government in favor of streamlined access to utility data. 	<p>Benefit: Students gain valuable experience in an increasingly important field</p>
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Regulators

<ul style="list-style-type: none"> ● Action: Direct utilities to implement Green Button Protocol and enable Data Exchange with the US EPA’s 	<p>Benefit: Improvement in cost-effective energy efficiency programs</p>
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ENERGY STAR Portfolio Manager, granting cost recovery via energy efficiency program budgets.	
Utilities	
<ul style="list-style-type: none"> • Action: Standardize utility data storage systems in a manner that allows for easy implementation of Green Button Initiative and Portfolio Manager Data Exchange. 	<p>Benefit: Receive cost recovery of streamlined data access implementation through energy efficiency portfolio program.</p> <p>Benefit: Evidence suggests that utilities offering streamlined access to utility data receive higher customer service ratings and can use benchmarking data to optimize efficiency program implementation.</p>



Conclusion

Building energy benchmarking is a widely-accepted best practice meant to improve building performance, reduce energy consumption, and reduce carbon emissions. The opportunities for reduced energy consumption are especially pertinent in the public sector, where facility portfolios are large, comprised of structures at various points in their lifecycle, and present sizable opportunities for energy savings. Yet, access to meaningful and actionable energy data has been a challenge for many states and municipalities due to a sea of bills and invoices spanning multiple utilities, external record-keepers, and internal administrative structures.¹⁴⁴

Efforts can and should be taken to overcome the resource constraints that often lead to a lack of dedicated funding, sometimes leaving benchmarking efforts to be implemented sporadically by temporary staff, rather than a dedicated energy manager or energy management office at the state level. Facility managers, municipal officials, and state energy officials can all contribute to the case for the dedicated resources needed for pursuit of benefits that flow from building energy benchmarking.

The benefits of streamlined data access are clear; whether through EDI, Green Button, Data Exchange, or third party services, simplified utility data access for municipalities can save money, time, and carbon emissions. This is especially true in the public sector, where the need for energy management is strong, but resource constraints can be commonplace. States, municipalities, and taxpayers stand to benefit from streamlined data access options.

¹⁴⁴ For further information on energy data use cases and associated barriers, See Generally, California Public Utility Commission Decision 14-05-016, *Decision Adopting Rules to Provide Access to Energy Usage-Related Data While Protecting Privacy of Personal Data*. (May 2014) Accessed: 4/28/15. Available at: http://switchboard.nrdc.org/blogs/lettenson/CPUC%20Data%20Access%20Decision_May%201,%202014.pdf

Appendix A: Sample Outreach to Regulatory and Efficiency Program Staff

We, municipalities and concerned parties within the Distribution Service Territory of (Utility Name), are contacting you to express our need for machine-readable electronic access to customer data to streamline our ability to retrieve data to facilitate building energy benchmarking, identify billing errors, assist third-party energy data analysis, and encourage participation in energy efficiency programs leading to energy efficiency retrofits.

We believe that both taxpayers and ratepayers would benefit significantly from implementation of **Green Button** and **Green Button Connect My Data** Initiative, as well as the US Environmental Protection Agency (EPA)'s **ENERGYSTAR Portfolio Manager's Data Exchange** option ("Automated Benchmarking").

Public Sector Building Energy Benchmarking:

Streamlined access to utility data would reduce administrative burdens and manual input errors associated with building energy benchmarking initiatives, especially in the public sector where building energy usage portfolios span a multitude of utilities and fuel types. In turn, this would encourage public sector building energy benchmarking initiatives, resulting in several different benefits including:

- **Reduced Energy Usage and Costs.** This is important because buildings are responsible for approximately 40 percent of global energy usage and related emissions.¹⁴⁵ Tracking energy usage is an essential first step toward reducing energy consumption and associated costs because such tracking can be used to identify opportunities for strategic energy investments. The EPA notes that building owners who consistently benchmark energy usage save 2.4 percent of their energy per year.¹⁴⁶
- **Identified Billing Errors.** Comparing a building's billed energy usage at varying points in time can help building owners detect clerical errors which may have resulted in higher-than-warranted energy bills.
- **Leading by Example.** Economies of scale within the public sector present a unique opportunity to lead by example and catalyze transformation in the broader commercial market. Furthermore, the prominence of public buildings within the broader built environment affords a unique opportunity for the public sector to lead by example, disseminating building energy conservation best practices such as benchmarking into the broader community. For example, court houses, schools, and town halls often see high volumes of varying occupants who may benefit from exposure to such practices.

Streamlining Utility Data Access Benefits Ratepayers and Efficiency Programs:

In 2011, the National Association of Regulatory Utility Commissions (NARUC) issued its *Resolution on Access to Whole-Building Energy Data and Automated Benchmarking*.¹⁴⁷ The National Association of

¹⁴⁵ United Nations Environmental Program (UNEP). *Buildings and Climate Change: Summary for Decision Makers*. (2009) Page 6. Available at: <http://www.unep.org/sbci/pdfs/sbci-bccsummary.pdf>

¹⁴⁶ US Environmental Protection Agency. *ENERGYSTAR Portfolio Manager: Benchmarking and Energy Savings Data Trends*. Available at: http://www.energystar.gov/sites/default/files/buildings/tools/DataTrends_Savings_20121002.pdf

¹⁴⁷ National Association of Regulatory Utility Commissions. *Resolution on Access to Whole-Building Energy Data and Automated Benchmarking*. (July 2011) Available at: <http://www.naruc.org/Resolutions/Resolution%20on%20Access%20to%20Whole-Building%20Energy%20Data%20and%20automated%20benchmarking.pdf>



State Utility Consumer Advocates (NASUCA) supplemented this with its own similar resolution¹⁴⁸. This resolution urged public utility commissions seeking to capture cost effective energy savings to consider comprehensive benchmarking policies that:

- (1) Use EPA's ENERGY STAR Portfolio Manager automated benchmarking services;
- (2) Leverage energy data associated with automated benchmarking to accurately credit program impact to benchmarking and drive efficiency programs; and
- (3) Provide aggregated and anonymized building energy data where necessary.

Streamlined Utility Data Access can Cost-Effectively Contribute to Efficiency Program Budgets:

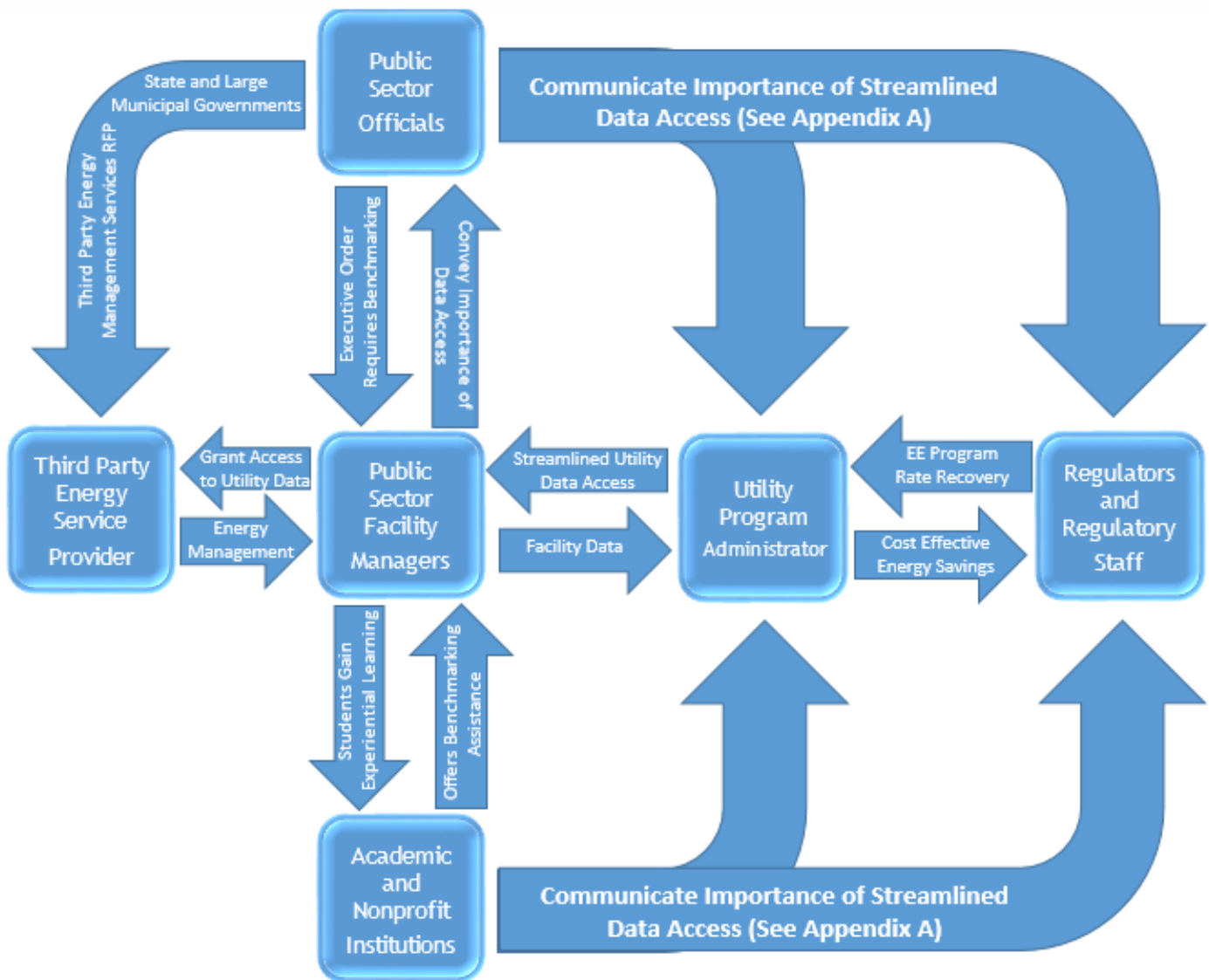
We believe streamlined data access options should be implemented by our distribution utility, and that regulators should grant them cost recovery for implementation within their energy efficiency program budget. Evidence suggests that streamlining access to utility energy data would result in:

- Increased implementation of building energy benchmarking initiatives due to reduced administrative burden, especially in the public sector where building energy usage portfolios consist of a multitude of bills and invoices spanning many different buildings and fuel types.
- Greater participation in energy efficiency programs due to increased ratepayer awareness of energy investment opportunities, as well as possibilities for leveraging energy usage data for targeted implementation of utility energy efficiency programs.
- More effective behavioral energy efficiency program delivery through the increased visibility of energy usage trends provided through interval meter data.
- Alternative methods of efficiency program measurement and verification in certain cost-effective scenarios.

¹⁴⁸ National Association of State Utility Consumer Advocates. *Resolution Supporting Automated Benchmarking of Multifamily Buildings for Energy Efficiency Purposes*. (November 2013) Available at: <http://nasuca.org/2013-05-supporting-automated-benchmarking-of-multifamily-buildings-for-energy-efficiency-purposes/>



Appendix B: Recommend Actions for Streamlining Utility Data Access





Appendix C: Key Resources

Region's Executive Orders

- Delaware
http://governor.delaware.gov/orders/exec_order_18.shtml
- Massachusetts
<http://www.mass.gov/anf/docs/dcam/dlforms/energy/energy-eo484-final.pdf>
- New York
<http://www.dec.ny.gov/energy/71363.html>

Region's Municipal Ordinances

- Boston, MA
http://www.cityofboston.gov/images_documents/Signed_Ordinance_tcm3-38217.pdf
- Cambridge, MA
http://www.cambridgema.gov/~media/Files/CDD/Climate/Building%20Energy%20Use%20Disclosure%20Ordinance_20141106.ashx
- Philadelphia, PA
<http://legislation.phila.gov/attachments/13351.pdf>
- Pittsburgh, PA
<https://www.go-gba.org/wp-content/uploads/2016/10/Legislation-Text.pdf>
- Portland, ME
<http://me-portland.civicplus.com/AgendaCenter/ViewFile/Item/4277?fileID=18409>
- New York, NY
http://www.nyc.gov/html/planyc2030/downloads/pdf/1184of2009_benchmarking.pdf
- Washington, DC
<http://dcclims1.dccouncil.us/images/00001/20080819161530.pdf>

Region's Legislation

- Connecticut
<http://www.cga.ct.gov/2013/act/pa/pdf/2013PA-00298-R00HB-06360-PA.pdf>
- Maryland
<http://energy.maryland.gov/incentives/state-local/sbeeca/SB267.pdf>

US Department of Energy Resources

- State and Local Solutions Center: Access and Use Energy Data
http://energy.gov/eere/slsc/access-and-use-energy-data?Assistance_Area=Access%20and%20Use%20Energy%20Data
- Toolkit: Energy Data Access: Blueprint for Action
<http://betterbuildingssolutioncenter.energy.gov/toolkits/energy-data-access-blueprint-action>
- *Energy Data Collection and Tracking in the Public Sector: Best Practices for Establishing a Robust and Sustainable Energy Data Management Program* (Forthcoming)
- SEE Action: A Regulator's Guide to Third Party Data Access for Energy Efficiency
https://www4.eere.energy.gov/seeaction/system/files/documents/cib_regulator_privacy_guide_0.pdf
- Lawrence Berkeley National Lab: Building Energy Data Exchange Specification (BEDES) Online Dictionary
<https://bedes.lbl.gov/bedes-online>



US Environmental Protection Agency Resources

- ENERGY STAR Portfolio Manager Training Presentations
http://www.energystar.gov/buildings/training?c=business.bus_internet_presentations
- ENERGY STAR Portfolio Manager Quick Start Guide
http://www.energystar.gov/sites/default/files/tools/EnergyStar_QuickStart_508.pdf
- ENERGY STAR Guidelines for Energy Management
http://www.energystar.gov/sites/default/files/buildings/tools/Guidelines%20for%20Energy%20Management%206_2013.pdf
- Using Web Services to Exchange Data with Portfolio Manager
<http://www.energystar.gov/buildings/service-providers/service-and-product-providers/use-web-services-exchange-data-portfolio-manager>

Northeast Energy Efficiency Partnerships Resources

- *Building Energy Benchmarking and Disclosure Policies in the Northeast and Mid-Atlantic*
<http://www.neep.org/sites/default/files/resources/Benchmarking%20and%20Disclosure%20in%20the%20Northeast%20and%20Mid.Atlantic%20Final%204.6.15.pdf>
- *Building Energy Rating and Disclosure Policies: Update and Lessons from the Field*
http://www.neep.org/sites/default/files/resources/BER%20Supplement_FINAL%20DRAFT_2-25-13_0.pdf
- *Building Energy Rating and Disclosure Handout*
http://www.neep.org/sites/default/files/resources/NEEP%20BER%20Supplement%20Handout%20Update7-20-16_6.pdf
- *Regional Operations and Maintenance Guide for High Performance Schools and Public Buildings in the Northeast and Mid-Atlantic*
http://www.neep.org/sites/default/files/resources/O%26M%20Guide%20Revision%20v2.5_FINAL.pdf

Other Notable Resources

- The Regulatory Assistance Project: Driving Building Energy Efficiency with Aggregated Customer Data
<http://www.raonline.org/document/download/id/6637>
- Green Button Alliance Homepage
<http://greenbuttonalliance.org/>
- Institute for Market Transformation: Creating Value from Benchmarking: A Utility Perspective
http://www.imt.org/uploads/resources/files/Creating_Value_From_Benchmarking_IMT.pdf
- Institute for Market Transformation: Utilities' Guide to Data Access for Building Benchmarking
http://research.cbei.psu.edu/media/files/IMT_Report_-_Utilities_Guide_-_March_2013.pdf
- Minnesota Department of Commerce Division of Energy Resources: Integrating Benchmarking into Utility Conservation Improvement Programs to Capture Greater Energy Savings
<https://mn.gov/commerce/energy/images/55323-71145-Weidt2014Benchmarking.pdf>