ENVIRONMENTAL FINANCIAL ADVISORY BOARD

JAN -2 2014

Honorable Gina McCarthy
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Ms. McCarthy:

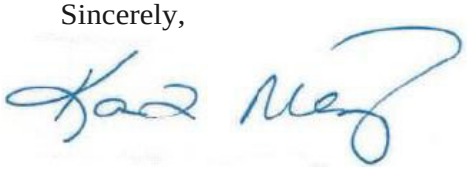
Enclosed you will find the report, "Municipal Energy Efficiency and Greenhouse Gas Emissions Reduction: Financing and Implementing Energy Efficiency Retrofits in City-Owned Facilities." The report was drafted at the request of the EPA Region 1 office that requested the Board produce a document that would help smaller communities understand the benefits of processes to develop and methods of financing energy efficiency projects. The Board reviewed a vast amount of existing information and distilled it down to a useable educational piece that will help communities, particularly those without dedicated energy staff, decide whether and how to move forward on efficiency measures. We believe it is a good basis and starting point for EPA outreach to smaller communities on a topic that makes sense both for the environment and the economy.

In addition to producing the report, the Board also recommends that EPA take the following four steps:

1. Disseminate this report and relevant information proactively and broadly;
2. Coordinate activities in the energy efficiency arena between various relevant governmental entities, commissions and advisory boards (in particular EPA's Local Government Advisory Board);
3. Actively refer local governments to the excellent materials (such as Energy Star, Target Finder, etc.) on the EPA website; and
4. Monitor the models being implemented by local governments to determine what is effective and can be replicated-and again, share that information proactively and broadly.

Thank you for the opportunity to explore this subject and we look forward to seeing increased energy efficiency measures taking place in local government facilities.

Sincerely,



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Environmental Financial Advisory Board

Enclosure

cc: Robert Perciasepe, Deputy Administrator
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Environmental Financial Advisory Board

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Municipal Energy Efficiency and Greenhouse Gas Emissions Reduction: Financing and Implementing Energy Efficiency Retrofits in City-Owned Facilities

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Municipal Energy Efficiency and Greenhouse Gas Emissions Reduction: Financing and Implementing Energy Efficiency Retrofits in City-Owned Facilities

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BACKGROUND

Retrofitting municipal buildings for increased energy efficiency (EE) and financing the retrofits with the energy cost savings achieved creates an opportunity to reduce harmful emissions, to save cities money and to drive economic growth. The national motivation to focus on municipal building retrofits is obvious: 19,492 cities and public entities in the U.S. control billions of square feet of building space and spend about billions of dollars per year on energy. As President-elect Obama noted when introducing his economic recovery plan in December 2008, reducing energy use in public buildings could save America taxpayers billions of dollars each year. Further, he said, "It will put people back to work."

The local motivations for investing in municipal energy efficiency are myriad, and concern critical issues confronting local elected officials.[1]

- Improvements in the energy efficiency of local government operations (e.g., buildings, vehicle fleets) can reduce *maintenance and operating costs*.

- Integration of energy efficiency into community design and public service provision (e.g., transportation infrastructure, water and wastewater, and energy distribution infrastructure) can *reduce or avoid capital costs*. These avoided costs can, in turn, *decrease or prevent increases in local taxes or utility rates*.

- Efficiency can improve the economic strength, resilience, competitiveness, and wealth of a community. Energy cost savings in municipal buildings allow for those funds to be spent elsewhere, which can result in *more investment in the local economy* than would have occurred from spending those funds on imported energy.

- Energy efficiency can *create local jobs*, both through direct employment in projects, and through the reinvestment of energy cost savings in local businesses and services.[2]

- Efficiency can *improve local energy security* by decreasing demand for resources from outside the community.

- Efficiency can reduce greenhouse gas emissions and other air pollutants, an important objective for many communities focused on addressing climate change or environmental health concerns.

Despite the obvious advantages of EE retrofits, cities are often stymied by financing the endeavor and the advantages of EE retrofits are meaningless without access to the capital with which to fund their implementation. The upfront capital costs of EE retrofits can be significant and payback periods can be up to 20 years or longer for deep retrofits. Furthermore, with American Reinvestment and Recovery Act of 2009 (ARRA) funding mostly depleted, cities are struggling to find sustainable sources of funding to support ongoing energy efficiency investments in addition to

[1] ACEEE. "Fact Sheet: Energy Efficiency Policies for Local Governments." Available at: https://www.aceee.org/fact-sheet/local-government-ee-policy

[2] ACEEE. "How Does Energy Efficiency Create Jobs?" November 14, 2011. Available at: http://aceee.org/fact-sheet/ee-job-creation

one-off retrofits. These challenges are particularly severe for smaller cities with aging building stock and modest cash reserves.

While there is no silver bullet solution for all cities, several mechanisms have been developed to meet the need for sustainable municipal financing of EE retrofits in public buildings. This report considers the challenges and steps leading up to EE retrofits; describes various financing mechanisms; references several reports that provide more in-depth analysis; and lists financial resources available to support municipalities' efforts in energy efficiency.

Successful energy efficiency retrofit projects tend to follow three steps before the actual construction begins: baseline inventory and audit, thoughtful project selection, and selection of a financing mechanism. This report covers each of these steps, in addition to the common challenges encountered with such a project.

CHALLENGES

Energy efficiency retrofits, and acknowledgment of their myriad benefits, are not a new idea. However, no community has successfully retrofitted all its buildings, even where the value and need is recognized. Why the disconnect? For many decision-makers faced with running governments or large organizations, EE may simply not be a priority, or the barriers to prioritizing it may be perceived as too high. It is a common misperception that undertaking energy efficiency efforts requires sophisticated knowledge and expertise, and lacking that, the promised savings from energy efficiency may be dismissed. Furthermore, the payback period of energy efficiency efforts is tied to the difference between current and anticipated future energy costs. Municipal budgets, if voter approval is needed, may not be positioned to undertake projects that have payback periods greater than a few years even though the long term savings might be significant.

Some of the challenges to comprehensive upgrades are as follows:

- **Upfront capital cost:** As previously noted, without ready access to cheap capital, the size and number of potential projects is limited, along with job creation potential and economic benefit. Even with cheap capital readily available, the upfront capital cost of comprehensive whole-building retrofits can be daunting.

- **Looking for quick payback period:** Decision-makers often choose to cherry-pick measures that will pay for themselves quickly — the low-hanging fruit. There is a common tension between the limited number of projects with quick paybacks and the larger number of projects with both large capital and extended payback periods. This is where lifecycle cost analysis comes into play, as long-lived infrastructure can generate significant cost savings when measured over decades of operating life.

- **Inability or limited ability to borrow/bond and impact of project bonding on credit rating:** State and local governments across the country are facing diminished revenues as a result of a smaller tax base, reduced federal contributions, and other factors. While a tight budget should provide an incentive to increase buildings' efficiency, the poor financial condition of many governments puts constraints on their ability to finance the improvements. While not all jurisdictions are in dire straits, in those where the debt capacity is at or close to a state or self-imposed limit, where the credit rating is weak or the

size of the project is small, bonding for energy efficiency projects may not be feasible, in spite of the project's ability to cover the debt service through efficiency savings.

- **Diffuse control of buildings and/or building systems and lack of reliable information on energy expenditures:**[3] Hard though it may be to believe, many municipalities are unaware of how many buildings they own. If they do know this, they are unlikely to know how much energy each property uses. Procedures for tracking this data are likely to vary significantly from department to department, and in many instances, there is no single person who is aware of or responsible for tracking energy usage at either a departmental or municipal level. Without this knowledge, and without centralized control, it is very difficult to determine which buildings are wasting the most energy, what the potential for savings are, and where opportunities lie. This is why many projects are of the "change the lighting in city hall" variety — a good showcase, but nowhere near the comprehensive effort needed.

- **Political will and turnover in elected/appointed leadership:** To put it bluntly, energy efficiency projects are usually not politically sexy. The improvements may not be not visible, the savings are not immediately apparent to constituents, and the payback, especially for deep retrofits, is not realized before the next election. If political leadership does decide to implement an energy efficiency plan, it probably should be sold as a strategic investment into sustainable development practices; otherwise, the plan risks becoming labeled as a political pet project. Incoming administrations might not understand or support either the long-term sustainability vision for the municipality or the projects that are proposed.

STEP ONE: BASELINE INVENTORY AND AUDIT

Information is king. The first step in a retrofit is to understand the impacts that improvements in energy efficiency would have on a particular building. This step requires establishing a baseline for energy consumption and periodically reviewing energy performance post-improvement. The U.S. EPA recommends the following key approaches for assessing baseline building energy performance in existing buildings include: [4]

- **Use available, standardized tools and audit protocols for baseline energy consumption assessments.** Standardized tools can be used to help assess baseline energy performance and track building energy data. For example, ENERGY STAR'S Portfolio Manager is an online tool that can be used to assess baseline energy performance in existing buildings and compile data across a portfolio of buildings.[5] Commercial software packages are also widely available.

- **Benchmark or meter buildings.** Benchmarking involves comparing a building's energy performance to the performance of similar buildings. The most meaningful benchmark comparisons compare buildings that operate in nearby areas or, at minimum, under similar

[3] Irwin, James, Satya Rhodes-Conway, Sarah L White and Joel Rogers. "Making MUSH Energy Efficient." Center on Wisconsin Strategy. Accessible at: http://www.cows.org/_data/documents/999.pdf.

[4] U.S. Environmental Protection Agency. "Energy Efficiency in Local Government Operations." 2011. Accessible at: http://www.epa.gov/statelocalclimate/documents/pdf/ee_municipal_operations.pdf.

[5] ENERGY STAR – Portfolio Manager: http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager

climate conditions. For certain building types, EPA provides an energy performance scale in Portfolio Manager to compare buildings nationwide on a scale of 1 to 100. For example, a score of 75 means that the evaluated building performs better than 75 percent of similar buildings nationwide. This information can help local governments prioritize buildings for energy efficiency investments and/or a comprehensive energy audit (see the next bullet, below). Note that benchmarking is only as reliable as the availability of utility bills. If comprehensive utility information is not available for one to three years, it may be advisable to meter the property to allow for the collection of baseline data and the tracking of post-retrofit energy savings.

- **Conduct technical assessments and audits.** In addition to establishing baseline energy performance and determining a building's relative performance compared to its peers, a thorough energy performance assessment includes comparing the actual performance of a building's systems and equipment with its designed performance level or the performance level of top-performing technologies. These technical assessments can be conducted as part of a whole-building energy audit conducted by an energy professional and used to identify priority energy efficiency investments.

An investment-grade audit will determine which EE measures are cost-effective over a reasonable time horizon (often between 10 and 20 years). Energy audits can be done on either a portfolio or unit-specific basis as it pertains to buildings. Targeted areas typically include building heat losses and excess energy consumption from older equipment. Recommendations can include simple items like insulation, window replacements, lighting replacements, boiler and chiller upgrades or replacements, high efficiency motors and variable frequency drives on pumps, and energy management control systems.

Energy audits can also focus on local government services. Street lights and traffic signals are typically significant energy consumers if not using upgraded technology. Besides switching out bulb/lamp types, the energy audit could also evaluate potential improvements from signal timing to improve traffic flows. Municipal water and wastewater treatment plants/infrastructure audits often identify substantial EE opportunities. Additionally, local government fleet upgrades are another possible area for energy efficiency gains.

Many local governments have incorporated energy audits into energy performance contracts, which are contracts that offer a one-stop process for purchasing, installing, maintaining, and often financing energy-efficiency upgrades at no upfront cost. The U.S. EPA has developed a directory of energy professionals, energy service companies (ESCOs), and other companies that can provide local governments with expert advice and technical assistance on conducting energy audits and entering energy performance contracts.[6]

Best practices for energy audits and retrofit installation include the following:

- **Use qualified professionals.** Energy audits are best performed under the direction of a professional or firm specializing in energy audit activities. Individuals qualified to perform energy audits may include licensed professional engineers, certified energy managers, or commissioning authorities. Firms qualified to conduct building energy audits include ESCOs, building engineering companies, building energy consulting companies and public

[6] See http://www.energystar.gov/index.cfm?c=spp_res.pt_spps for a directory of energy service and product providers.

utilities, to name several. The actual retrofit can be carried out by an ESCO or qualified contractor, under the supervision of a knowledgeable construction manager or general contractor. In the case of retrofits involving significant capital improvements, it is often wise to engage a third-party construction manager to ensure that the retrofit is taking place according to plan. It is wise to scrutinize the credentials of proposed service providers and to require multiple bids before selecting vendors. Local governments that lack a sufficiently trained staff to vet vendors might wish to contract with a third-party expert to help select vendors.

- **One-stop shopping or consortium of independent third-party service providers?** Local governments should consider whether they prefer to undertake building energy-efficiency construction or upgrades through a single ESCO, or through a group of carefully-chosen independent contractors. A single ESCO might provide a highly cost-effective solution, but the use of third-party firms might result in a more suitable, customized design and installation process, especially if a variety of equipment suppliers are desired. (Some ESCOs work with only one brand of building equipment.) Every property or portfolio is different, so it is best to vet a variety of alternatives before engaging vendors.

- **Use recognized consensus standards to guide the audit.** Ensure that the energy audit is conducted in accordance with widely recognized consensus standards.

- **Benchmark.** Energy benchmarking is typically performed on the basis of a one- to three-year review of utility records. If possible, it is best to perform records-based benchmarking over a two-year period, at minimum, to eliminate the effects of unusual weather conditions. In some instances, however, records gaps may reduce the usefulness or cost-effectiveness of paper benchmarking. In such instances, it may be preferable to install meters to record utility usage or eliminate the paper benchmarking. The advantage of property metering to record energy usage is that fine-gauged data can be recorded both pre- and post-retrofit to monitor savings and ongoing building performance.

- **Be aware that energy benchmarking and audit costs may vary widely, depending on project scope, condition and complexity.** Costs depend on the scope of the audit desired, the size, condition and standardization of the property or portfolio to be audited, and whether the firm conducting the audit will also supply the energy-efficiency equipment. For example, an ESCO that will supply and install energy-efficiency equipment may perform the initial energy audit for a reduced cost or for free. Service providers that do not supply and install energy-efficiency equipment will be obliged to charge for the audit service.

  If not bundled into the equipment cost, walk-through audits (ASHRAE Level I) are frequently priced at $.02-$.05 per square foot. Level II audits are frequently priced at $.10-$.15 per square foot. Investment grade audits (ASHRAE Level III) are frequently priced at $.20-$.30 per square foot, a sum that may vary depending on the complexity of the modeling to be performed.[7]

  It is necessary to stress that the cost of the audit will vary based on the size, condition or standardization of the property or portfolio to be audited. In some instances, such as apartment complexes comprised of units of uniform construction, it may be possible to use sampling to streamline unit inspection.

[7] Based on Leanne Tobias experiences and vendor discussions. (www.malachitellc.com)

STEP TWO: CHOOSING YOUR PROJECTS

Because local governments are concerned with long-term—as well as short-term—benefits and costs, they are well positioned to adopt life-cycle cost analyses when making decisions about purchasing energy-using products. Traditional methods for assessing project cost-effectiveness typically focus on the initial design and construction costs in the short-term. The life-cycle cost of a product or service is the sum of the present values of the costs of investment, capital, installation, energy, operation, maintenance, and disposal over the life of the product.[8] Because life-cycle cost analysis reveals whether energy efficiency investments are cost-effective over the long run, it can be an important feature of an overall energy policy.

While it can be tempting to cherry pick the obvious projects with very short (1-5 year) payback periods, we recommend that cities consider the comprehensive life-cycle of the improvements being considered, as well as the anticipated future savings derived from avoiding escalating energy costs (of note, estimating future energy cost escalation can be more art than science and the assumptions regarding future energy costs are critical to the estimate of life cycle cost savings). Often, more expensive energy efficient investments (such as boilers, chillers, heat pumps, control systems, etc) have longer-term paybacks, but also substantially longer useful lives. If a building has a 50-60 year remaining useful life span, does a 2 to 3 year payback period make sense or should paybacks of 10 or more years and more substantial savings be valued equally or more heavily? [9]

Local governments can establish portfolio-wide energy efficiency goals for existing and new buildings to help maintain momentum for energy management activities, guide daily decision-making, and track and measure progress. For existing buildings, these portfolio-wide goals can be based on the results of the baseline energy performance assessment (relative to benchmarks) and the priority investments identified through that process. For new buildings, goals can be based on output from energy performance projection tools and best practices.

Key considerations for setting goals for improving portfolio-wide energy efficiency in buildings include:

- **Consider potential savings.** Assessing potential energy savings helps to determine appropriate portfolio-wide energy efficiency goals that are clear and measurable. Local governments can use information collected during energy performance assessments and technical audits to determine potential energy savings from priority investments. Local governments can also evaluate a building's benchmarking results to estimate potential savings based on the energy performance of similar buildings. For new and renovated buildings, local governments can consider the potential savings of each new or renovated building by using tools such as the Target Finder to set energy performance targets and assess building designs (e.g., local governments can aim for each new or renovated building to achieve a specific energy performance scale using Target Finder).[10] In addition, local

[8] As defined in Executive Order 13123: Greening the Government Through Efficient Energy Management. Available at: http://www1.eere.energy.gov/femp/pdfs/eoguidancedoc.pdf

[9] United States Forest Service. "Life-Cycle Cost Analysis for Buildings is Easier Than You Thought." Available at: http://www.fs.fed.us/t-d/pubs/htmlpubs/htm08732839/page01.htm

[10] More information on Target Finder is available here: http://www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder

governments can consider the savings achieved by similar organizations. EPA estimates that most new and renovated buildings can achieve energy savings on the order of 30 percent as compared to conventional buildings.[11]

- **Determine appropriate scope.** Goals for improving energy efficiency across a portfolio of buildings can be established at different levels, ranging from sub-agency and agency level up to portfolio-wide goals. These goals can also be established over varying time periods. Many local governments have established both short-term and long-term goals for improving energy efficiency in buildings that can lead to quick cost savings that continue to accrue far into the future.

  Goals for improving energy efficiency in a portfolio of local government buildings can be part of a larger goal that incorporates multiple clean energy activities. For example, energy efficiency goals can be part of a broader goal for reducing local government GHG emissions. For information on how local governments can procure clean power for their facilities and throughout the community, see EPA's *Green Power Procurement* guide[12] in the *Local Government Climate and Energy Strategy Series*.

[11] U.S. E.P.A. "Energy Efficiency in Local Government Operations: A Guide to Developing and Implementing Greenhouse Gas Reduction Programs." Available at: http://www.epa.gov/statelocalclimate/documents/pdf/ee_municipal_operations.pdf

[12] U.S. E.P.A. "Green Power Procurement." Available at: http://www.epa.gov/statelocalclimate/documents/pdf/greenpowerprocurement.pdf

STEP THREE: FINANCING YOUR PROJECTS

Finding funds to retrofit an existing government building or to increase the efficiency of planned new construction can be a challenging endeavor. While ARRA was a viable source of funds for extensive local government building retrofits, the funds have generally expired or been spent by now, so cities must look elsewhere to finance their building improvement efforts. There are various traditional and cutting-edge financing mechanisms being applied to municipal EE retrofits, many of which are included in the following list and detailed below: [13]

Summary of Energy Efficiency Financing Mechanisms for Municipalities

Funding Mechanism	Description	Pros	Cons
Grants	One-time or short-term source of funding for a specific project	Does not need to be repaid	Highly competitive. May have limits on use.
Bonds	Debt issued by local governments to raise capital	Can be used to generate large pools for funding for specific projects.	Must be repaid with interest. Transaction costs can be high.
Sale-Leaseback	Sale of a building and ensuing lease.	Generates cash flow to retrofit municipal buildings.	Transaction costs can be high.
Performance Contracting	Third-party financing for retrofits, repaid with energy savings	Reduces risk for municipalities; enables financing comprehensive retrofits.	Process involves serious negotiation, documentation and, often, high transaction costs.
Sustainable Energy Utility	Non-profit organization that pools state, federal and local funds for EE.	Provides up-front, patient capital for retrofits. Can address renewable energy as well as EE.	State legislation changes may be required; generally applicable at the state level.
Community Revolving Loan Funds	Capital pool that is loaned so funds are recycled in perpetuity.	Generally low interest rates, favorable terms.	Works best for projects with short paybacks.
Utility Funding Program	Funds from investor-owned utilities via partnerships, trust funds and other sources.	Can provide access to additional utility resources, such as participants and savings opportunities.	May be subject to additional regulatory oversight.
State Revolving Loan Fund	Capital pool that is loaned so funds are recycled in perpetuity.	Generally low interest rates, favorable terms, familiar structure.	Works best for projects with short paybacks.
Public-Private Loan Fund	Capital pool that includes public money as well as private funds.	Minimizes dependency on state and federal funding for EE retrofits.	Model is still developing; may carry high transaction costs. Structure and terms are still being established.

[13] ACEEE published a report on sustainable funding initiatives that provided the structure for this section of the report. The authors of this report used ACEEE's evaluation of various funding sources for municipally-run EE programs and applied them to municipal retrofits, in addition to adding several other mechanisms. ACEEE's full report, which is a valuable resource for cities interested in funding for ongoing EE programs to benefit citizens, is entitled "Keeping it in the Community: Sustainable Funding for Local Energy Efficiency Initiatives", and can be found here: http://www.aceee.org/research-report/e124.

Grants

Grants are available from federal, state and local sources, as well as private foundations. They generally do not need to be repaid, but they also generally can only be relied on as a one-time or short-term source of funding. Grants may include limitations on the use of funds, but they can be particularly good for covering the cost of starting an efficiency program or funding a pilot program.

A key grant opportunity that was recently available to local communities was the Energy Efficiency and Conservation Block Grant (EECBG) program. The EECBG program was funded through the ARRA, which allocated over $2.7 billion to large cities and counties through formula and competitive grants. EECBG grants funded a wide variety of energy efficiency activities such as energy planning, building energy retrofits and weatherization, building code development and implementation, energy-efficient street lighting, and development of combined heat and power. EECBG funds could also be used for financial mechanisms such as revolving loan funds and loan loss reserves. While the EECBG funding has generally expired, smaller federal programs, state programs for local governments,[14] and other private funds continue to offer grants related to energy efficiency to local governments.

Examples:

- Los Angeles' Municipal Building Retrofit Program (Citywide retrofit program funded with EECBG money)[15]

- Wisconsin Retrofits and Lighting Program (State of Wisconsin awarded EECBG funds to 80 communities to conduct retrofits and lighting projects in municipal buildings)[16]

Bonds

Bonds are debt financing tools commonly used by municipalities to raise capital for projects. The options for bond financing, on a basic level, include general obligation bonds, which are secured by the city's ability to levy taxes or revenue bonds, which are secured by specified revenues. Both types of bonds are considered very low risk and are issued at lower interest rates than are available to the general public.

The federal government has created Qualified Energy Conservation Bonds (QECBs), tax credit bonds that may be used by local governments to finance energy conservation projects. Qualifying projects include energy upgrades of public buildings, loans and grants for community programs, mass transit facilities, demonstration projects, and education campaigns. The QECB program provides two options to subsidize the cost to issuers (local governments): a federal tax credit is provided to the bondholder in lieu of receiving interest payments or a direct subsidy payment is made to the issuer. These direct payments (equal to 70% of the interest allowed by the U.S. Treasury) are used to pay interest on the bonds, decreasing the interest costs by approximately 70%.

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[14] Michael Sciortino. "How States Enable Local Governments to Advance Energy Efficiency". May 11, 2011. Available at: http://aceee.org/white-paper/state-enabling-local-ee.

[15] http://recovery.lacity.org/recovery/rpt_project_profile.cfm?id=89

[16] Wisconsin State Energy Office
http://www.stateenergyoffice.wi.gov/subcategory.asp?linksubcatid=3529&locid=160

Each state receives a QECB allocation, a portion of which is allocated directly to municipalities and counties with populations of 100,000 or more. The application process for QECBs varies by state. As of March 1, 2013, only $762.6 million of the $3.2 billion allocated to QECBs had been issued by state and local governments.[17] These unissued bonds represent a huge potential seed funding source for energy efficiency programs; however, their use is complicated by the impacts of sequestration. The IRS has advised issuers that direct subsidy payments will be reduced by 8.7% through the end of the Federal Fiscal Year 2013. The impact of sequestration on QECB issuers that did not opt into direct payments is unclear at this time. [18]

Examples:

- Philadelphia, PA undertook a project to upgrade lighting, control systems and water conservation measures in four buildings. Approximately one-half of the $12 million project costs were funded through the issuance of QECBs. Energy savings in the buildings ranged from 18% to 24% with a net energy savings of $10 million. After application of the QECB direct subsidy payments, the net interest rate for the 15 year term was 2.31%.[19]

- Reno, NV used a combination of financing mechanisms, including QECBs, to fund almost $20 million in energy efficiency and renewable energy projects in municipal facilities throughout the city. [20] As a result of measures installed in City Hall, the energy costs in that facility were reduced from $4.54 to $2.54 per square foot. The energy cost savings have provided sufficient savings to pay all debt service on the bonds with no impact to the City's general fund.[21]

Sale-Leaseback

A sale-leaseback enables cities to monetize their fixed building assets by selling the asset and leasing the asset back for a prescribed term. The transaction functions much like a loan—the sale price received is the loan and the rent paid is the repayment of the loan. Through a sale-leaseback, a municipality could use sale proceeds to install energy retrofits in the leased facilities. The parties to the transaction are the municipality (seller) and a special purpose government entity (purchaser). The purchaser issues lease revenue bonds which are repaid by the lease payments

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[17] Bellis, Elizabeth. Energy Programs Consortium, NASEO Finance Committee, March 7, 2013, "Update on QECBs, Sequestration & Wheel.". Available at: http://www.naseo.org/Data/Sites/1/documents/committees/financing/notes/2013-03-07-bellis.pdf

[18] Ibid.

[19] Lawrence Berkeley National Laboratories, "Using Qualified Energy Conservation Bonds for Public Building Upgrades: Reducing Energy Bills in the City of Philadelphia." July 18, 2012. http://financing.lbl.gov/reports/public-building-qecb.pdf

[20] Curtis Framel, "Innovative Energy Efficiency Projects Implemented by Local Governments in the Southwest." January 2012. Available at: http://swenergy.org/publications/documents/Innovative%20Local%20EE%20Projects%20in%20the%20Southwest.pdf

[21] Ibid.

from the municipality. At the end of the lease, the municipality repurchases the retrofitted building at a pre-negotiated, nominal cost.

Lease payments will be dependent upon the appropriation of the municipality (seller/lessor) and legal remedies to limit the impact non-appropriation will be included in the sale-leaseback agreement. Due to the risk that the lease payments may be terminated or not appropriated before the obligation is repaid, the assigned bond rating will most likely be lower than the lessee's general obligation credit rating (this structure works best if the assets that are included in the financing are essential assets so that appropriations will be most likely made to support the bonds) . With a lower bond rating, the cost of borrowing is likely to be higher than other types of bonds; however, this structure can still be a valuable financing mechanism. Sale-leaseback structures may not trigger debt limitation provisions of some states and the use of the proceeds (purchase payment) can be more flexible than other types of debt.

These transactions have been structured so the proceeds are deployed towards both energy efficiency retrofits and to cover other budget items or budget shortfalls. The efficiency of this transaction is optimized by earmarking a significant portion of the proceeds to achieve ongoing energy savings measures, thus lowering the effective cost of capital of the entire transaction. These energy savings are attributed to system upgrades that will in effect promote more efficient operation.

Example:

- The City of Providence, RI, entered into a sale-leaseback transaction with the Providence Public Building Authority. Facing significant budget shortfalls, the City sold a number of city buildings to the Building Authority and leased them back over a period of 15 years. At the end of the lease term, the city will repurchase the buildings for $1. The Building Authority issued $35 million in lease revenue bonds, secured by the lease payments from the City, to purchase the buildings. Proceeds from the sale were used to install energy efficiency retrofits and renewable energy measures a number of buildings including the city hall, school administration building and public safety facilities. Those funds not used for energy upgrades were used to fund a significant budget shortfall for the city.

Performance Contracting

In an energy performance contract, an ESCO or other entity provides customers with a comprehensive set of energy efficiency measures (which also may include cogeneration, renewable energy and/or water efficiency measures). ESCOs have traditionally developed, implemented and often helped to arrange financing for projects. However, as a result of the Dodd-Frank Wall Street Reform and Consumer Protection Act (passed in 2010), ESCOs are no longer able to administer financing programs or originate loans unless they are registered Municipal Financial Advisors, which few are. The administrator/originator role is generally now held by third-party companies who add a full finance consulting service to their loans, or to specialty brokers.

After project completion, the ESCO monitors energy savings and maintains upgrades over many years. The ESCO normally guarantees that the project's savings will be sufficient to cover the cost of project financing for the life of the project. The guarantee creates a financial commitment for the ESCO to ensure the performance of retrofits during the contract term. One common performance contracting approach is a shared savings agreement under which the customer and the ESCO share the value of the energy savings based on a distribution specified in advance in a contract. If retrofits produce less than the guaranteed savings, the ESCO will pay the difference.

Performance contracting projects typically take several months to develop; the projects involve complex contracts and blend funds from several sources. While performance contracting is listed here as a type of funding, in truth the third-party funding is generally one of several funding streams, which may include utility incentives/rebates, revolving loan funds, grants, bonds, loans and leases. Performance contracting projects usually have relatively long payback periods (10+ years).

The U.S. Department of Energy maintains a Solution Center focus on Energy Savings Performance Contracting at http://www1.eere.energy.gov/wip/solutioncenter/financialproducts/ESPC.html.

Major ESCOs include Johnson Controls, Honeywell Building Services, Siemens, and Ameresco, in addition to hundreds of regionally-focused companies. Financiers include Hannon Armstrong and the Bostonia Group.

Examples:

- The City of Charlottesville, VA worked with Custom Energy Services to implement lighting and water conservation projects in 32 municipal buildings, including nine schools. The Capital investment of $1.8 million is expected to cut the city's energy usage by 10% and save approximately $198 thousand per year.[22]

- State of Connecticut's Lead by Example Energy Savings Performance Contracting Program: The State of Connecticut designed a standardized Performance Contracting program to encourage Connecticut municipalities and state agencies to implement comprehensive energy savings measures and more easily enter into performance contracts. The program is jointly administered by two agencies and is a collaborative effort across state government. The State developed the program to include pre-qualified vendors and contractors, on-call energy technical support, standardized contract templates, and targeted financial assistance to help ensure positive results. The performance contracting process enables state agencies and municipalities to perform energy efficiency upgrades on their buildings with no up-front costs. The initial costs of the upgrades are typically financed by a third party and then paid for through guaranteed savings on future energy bills. The financing could also rely on municipal leases or bonds, repaid with energy cost savings over time.[23] The first three organizations to engage in the program are the City of Bristol, the Connecticut Department of Corrections and the Connecticut Valley Hospital.

Sustainable Energy Utility

A Sustainable Energy Utility (SEU) is a non-profit organization that administers financing programs, offers technical assistance, and provides financial incentives to building owners (including municipal building owners) to implement efficiency measures and support renewable energy installations. In practice, SEUs have been implemented on a state-wide basis, so may not be applicable for municipalities within states where an SEU has not been developed.

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[22] http://www.naesco.org/resources/casestudies/documents/City%20of%20Charlottesville%20-%20PQ%20-%201-28-09.pdf

[23] Lynn Stoddard, Available at: http://www.ct.gov/deep/lib/deep/energy/lbe/espc_muni_workshop_slides.pdf

Examples*:*

- The Delaware SEU[24] was created in 2007 by legislation enabling $30 million in bonding authority. The SEU pre-screened financeable energy efficiency and renewable energy projects and established measurement and verification standards. Set-up costs were funded in part by an increase in the charge for energy efficiency and renewables paid by Delaware utility customers. Among other programs serving the Municipal, Universities, Schools and Hospitals (MUSH) market, the SEU covers the incremental costs between conventional and high-efficiency technologies. ESCOs work with MUSH building owners to commit to giving the SEU 33% of projected savings created by the installed measures for 3 to 5 years. After the contracted period, the owner retains 100% of the savings. This structure has financed $27 million in energy savings for building owners. The SEU offers incentives to developers of renewable energy equal to the difference between the cost of an equivalent conventional energy supply and the renewable energy installed. In exchange, developers provide the SEU with 25% of the Renewable Energy Credit (REC) proceeds generated by the project.

  The Delaware SEU pooled distributed energy efficiency and renewable energy projects and leveraged the State of Delaware's AAA credit rating to issue the first energy efficiency tax-exempt bond in the U.S. ($72 million in bond proceeds). This transaction solved the credit problem often faced by large financial institutions looking to invest in EE: since Delaware accepted the credit risk for the projects, investors were able to assess the risk of the bond based on a known, rated entity as opposed to based on multiple ESCOs/hosts with different credit ratings. This structure enables efficient pricing of the bond and fits the profile of an investment for which municipal financing groups are already comfortable.[25]

- In 2008, the District of Columbia passed a bill to create a Sustainable Energy Trust Fund to be managed by a SEU. A monthly surcharge assessed to electric and natural gas ratepayers amounting to roughly $20 million per year will fund new financing programs. The DC SEU has been tasked with developing financing programs to overcome barriers to energy efficiency and renewable energy investment for all building types for all demographic segments in DC.

[24] http://www.energizedelaware.org/

[25] "Energy Efficiency Financing: Models and Strategies." Prepared by Capital E for The Energy Foundation, March 2012. http://www.cap-e.com/Capital-E/Home_files/Energy_Efficiency_Financing-Models_and%20Strategies.pdf

Community Revolving Funds

Some communities use seed money such as grants, utility rebates/incentives or public benefit funds to create revolving funds for EE projects and to support their efforts to implement municipal EE projects. To replenish the monies spent, communities seek new grants or incentives and place the amount of energy savings generated by the project into the fund. Often, only a portion savings amount or the amount of savings generated in the first two years is placed in the fund. The remaining savings accrues to the general fund or budget of the unit covering the project. By sharing the savings with the revolving fund, municipalities or their units will see an economic benefit and be more willing to undertake future energy efficiency projects.

Projects funded through these community revolving funds often include those that are not eligible for other sources of low interest financing, to subsidize projects with long payback period or to fill financing gaps.

Examples:

- The Arizona Energy Conservation Savings Reinvestment Plan (the Plan) for the City of Phoenix was established in 1984 with seed funding from state oil overcharge funds. Under the plan, the City of Phoenix reinvests half of all documented energy savings in energy efficiency capital projects. All municipal departments in Phoenix are eligible, although the focus is on departments that are not revenue generating in nature (such as police, fire, library, human services, etc.). Eligible projects include, among others, upgrading lighting, motors and chillers.

  Energy savings are measured by comparing energy consumption before and after a retrofit, for the first year the improvement is in place. For the following ten years, half of this savings amount goes into the Plan fund which was capped at $500,000; the fund limit was reached within the first 3-4 years. The rest of the avoided costs accrue to the City's general fund.

  Phoenix also uses the Plan to subsidize the cost of new energy-efficient equipment for municipal departments. For example, the Plan covers the difference between the price of a more expensive, energy efficient piece of equipment over a standard piece of equipment. While many of the measures funded are considered low technology in nature, such as improved lighting, motors, and chillers, the Plan was critical in financing a district cooling system and a thermal storage system for a new City Hall, as well as small scale co-generation, solar, air volume, and waste water systems.

  Through the Plan, which is managed by Phoenix's Energy Management Program, Phoenix has achieved a savings, or more accurately has avoided incurring costs, that total $120 million through 2012. However, the low-hanging fruit have been identified and implemented and the stream of projects has slowed down over time.[26]

  Other municipalities can replicate this financing model by choosing to set aside funds to launch the program, and then by reinvesting a portion of their energy savings in energy efficiency. One of the keys to the success of the Phoenix Energy Management Program is that the City developed the ability to plan and monitor its actions and to calculate energy

[26] Interview with Dimitrios Laloudakis, Deputy Public Works Director, City of Phoenix.

costs and savings in-house. The City also created an Energy Conservation Team which included representatives from all municipal departments. It brought department managers on-board by promising support for their budgets through participation in the program, both in operations, and in future projects. Another key to the Phoenix model has been the recognition that about 8-15% of any energy efficiency project should be reserved for maintenance and operator training.

- In the mid-1990's, Alameda County, CA, used its Designated Energy Fund to support an energy office and energy projects for municipal facilities. In 1993 the County participated in Pacific Gas and Electric's (PG&E) Power Saving Partners program, their first demand side bidding program. The County's proposal to reduce its load by 1 MW was accepted by PG&E which agreed to pay the County four cents/kWh and $150/Kw for electrical reductions over a ten year period. Over the course of the program as much as $30,000 in incentives per month were being paid. By the end of the program, $3 million dollars had been received by the county. The County used the incentive to establish a revolving fund known as the Designated Energy Fund.

  The Fund pays for (a) projects with long life cycles (over 20 years) that have an internal return on investment of over 10% (such as large solar or fuel cell projects), and that don't qualify for full funding under California Energy Commission's low interest Energy Efficiency Finance program; and for (b)highly energy efficient equipment upgrades for which the maintenance budget covers only equipment with standard energy efficiency. The Fund is replenished by incentives from local utilities and savings from projects with short life cycles and payback periods of less than five years.

  The County's General Services Agency (GSA), which is also responsible for all centralized bill payment, administers the fund. Since 1995 the GSA has added a 9-11% surcharge on all County facility utility bills. The surcharge pays staff costs for project management and development, savings analysis quality control and financing. Originally the County proposed sharing the savings between the unit receiving the upgrade and the Energy Program; however, it was determined that a surcharge was easier to track and predict than savings.

State Revolving Funds

Many states have established funds to make loans for energy efficiency and renewable energy projects. EE loans are often made at below market interest rates with repayments tied to the savings provided by efficiency measure being installed. These funds were first established in the 1980's and capitalized by fines paid by oil companies for violations of price cap laws.[27] Since the initial funds were established, states have used a variety of other funding sources including general revenues, bond proceeds, environmental settlement funds, utility ratepayer charges and federal grants, including a large influx of capital through the ARRA in 2009.

According to the National Association of State Energy Officials (NASEO), through the years, revolving loan funds have expanded across the nation with at least 32 states administering over 56 different revolving funds for efficiency or renewable generation projects - 25% of which focus on

[27] State Energy Efficiency Policies, Options and Lessons Learned, Brief #1 Funding Mechanisms for Energy Efficiency. Matthew Brown, Sept 2008. Available at: http://ase.org/sites/default/files/file_Brief_1v3.pdf

buildings. Specific information (availability, eligibility, terms, etc.) about state revolving funds may be found at http://www.dsireusa.org.

In addition to energy specific revolving funds, the State Revolving Loan Fund for Drinking and Clean Water (DWSRF and CWSRF), capitalized by EPA grants, can be used for energy efficiency upgrades to water and wastewater systems. Since the ARRA, states have been encouraged (and in certain years mandated) to use a specified percentage of their EPA grant for green projects. Incorporating energy efficient components (motors, blowers, lighting, etc.) into a water or wastewater project not only provide energy savings, and lower operating costs, but also qualifies as a green project in many states. While states vary in their implementation of the DWSRF and CWSRF, green project status may provide communities an advantage in securing funds over other projects or qualify the applicant for more favorable financing terms.[28]

Examples:

- Laclede County, Missouri (population 35,400) received a loan from the Missouri Department of natural Resources' Division of Energy for $133,010 to upgrade lighting and the HVAC system in its Government Center. The Energy Revolving Fund provides loans to schools and local governments for energy efficiency projects. Loan rates are currently at 2.5% and range in size from $5,000 to $500,000. The repayment term and amount are determined by the energy savings generated by the project.[29] By pairing projects with quick payback (lighting) and longer payback (HVAC) Laclede County's annual energy savings of $36,648 allowed them to repay the loan in only four years and keep the savings for the remaining life of the equipment.[30]

- The State of Indiana has aggressively sought to fund green projects through its CWSRF and DWSRF programs and includes energy efficiency as one the four eligible categories. Water or wastewater projects with a qualifying energy efficiency component may receive a .5% reduction in the program's interest rates (currently 2-2.44% for 20 year loans)[31] and funding priority over other projects.[32]

  Princeton, IN, (population 8,624) has applied for a DWSRF loan for improvements to its drinking water distribution and treatment system. By installing variable speed pumps, the community is expected to see a 34% energy use reduction over constant speed equipment

[28] US EPA Drinking Water State Revolving Fund, Green Project Reserve Funding Status, March 26, 2010, available at: water.epa.gov/aboutw/eparecovery/upload/GPR_Summary_Report_Revised.pdf.

[29] See http://dnr.mo.gov/energy/docs/InAdditionRegularCycleFY2014.pdf for information regarding the Fiscal Year 2014 loan cycle.

[30] Interview with David Harrison, Schools and Local Governments Program, Division of Energy, Missouri Department of Natural Resouces.

[31] See Indiana Finance Authority at: http://www.in.gov/ifa/srf/2427.htm

[32] Indiana Finance Authority, State Revolving Fund Loan Programs Fact Sheet: Green Project Reserve/Sustainability Incentive, March 1, 2011 available at: http://www.in.gov/ifa/srf/2381.htm

and save approximately $26,000 per year in energy costs. Additionally, that portion of the project would qualify for the green project interest rate reduction on the DWSRF loan.[33]

Utility Funding Programs

An increasing number of state are passing legislation with energy efficiency standards or goals that require utilities to employ all cost effective energy efficiency measures before construction of new generation. As a result, electric and natural gas utilities are providing funds for a variety of energy efficiency programs for their customers. While the majority of these programs are limited to residential, business or industrial customers, some utilities also open access to governmental entities.

Rebates for the installation of energy efficiency measures or highly efficient equipment are the most common incentives available, but loans and grants are also options made available by some utilities. Additionally, a few utilities have provided funding for more comprehensive programs that could include audits, training and other services that municipalities can access or run and offer community wide.

Rebates provide a simple mechanism to offset a portion of the cost of retrofits or efficient equipment; however, they do not provide upfront acquisition or installation funds. Rebate programs generally fall into one of two categories: prescriptive rebates for standard or "off the shelf" measures/equipment or customized rebates for more complicated or costly installations. Prescriptive rebate amounts may be based upon fixture (lighting, refrigerators), size such as kWh or ton (AC, motors, chillers), square foot (insulation, window coverings) or cost differential between standard and highly efficient equipment (HVAC Systems). Information on these types of rebates is readily available on most electric utilities' websites and often do not require advance approval.

The types of qualifying equipment or projects vary greatly between utilities as does the amount of rebate. Custom rebates may be provided for measures not covered by prescriptive rebates or utilities may limit them to specific larger scale or more complicated measures such as whole building or comprehensive measures, energy management systems, or windows. Custom rebate programs generally require energy audits, certification of energy efficiency expected upon completion and prior approval. Again, programs offered and requirements vary by utility.

Examples:

- Puget Sound Energy (PSE) offers grants for efficiency upgrades to existing facilities for business and governmental customers. Grant programs tend to set forth specific projects that can be funded (often lighting, water heating, HVAC), have a specific amount or percentage of cost that will be paid. PSE provides 50-70% of the installed cost of an efficiency retrofit/upgrade and has no cap on the amount of the grant.[34]

[33] See the City of Princeton SRF Green Project Reserve Business Case at: http://www.in.gov/ifa/srf/files/GPR_Business_Case_Princeton_posted_11-23-10(1).pdf

[34] Puget Sound Energy: https://pse.com/savingsandenergycenter/ForCommunities/Pages/Energy-Efficiency-for-Communities.aspx

- San Diego Gas and Electric offers on an on-bill financing program, for which local government customers are eligible. This program allows 0% loans of up to $250,000 per meter (with a $5,000 per meter minimum) and a maximum of $1 million per account, with a payback of no more than ten years.[35]

On-bill financing programs are becoming more common with most half of the states having or working on legislation to allow it. Where offered, programs provide low or no-cost financing with paybacks generally ranging from five to ten years. The periodic payments are simply added as a line item on the the electric bill. The types of projects eligible tend to be the lighting, HVAC and whole building weatherization. Most programs require that the energy savings exceed the loan repayments which may limit certain installations such as windows, boilers, etc. It should be noted that utility rebate programs can often be layered with utility on-bill financing (or non-utility grant or loan programs). The rebates can then be used to buy down the loan amount, for general fund purposes or as seed money for other projects or the establishment of an energy office. Alameda County, California (previously described on page 16 of this report) and San Jose, California each have established internal revolving funds, initially capitalized by rebate or other similar utility company funding, that are used for efficiency measures and to support Energy Office services.

Public-Private Loan Funds

An infrastructure financing facility is an entity that is designed to encourage private investment in particular infrastructure projects. Banks can invest in particular projects via the facility and also (though this depends on the structure of the particular transaction) take on some portion of the risk associated with cost overruns, shielding a city from unanticipated budget increases as project construction wears on. A financing facility is an alternative (or supplement) to traditional bonding and federal grant funding that facilitates private investment in public infrastructure. It is a particularly appealing option for cities that may have trouble bonding for political or budgetary reasons or that cannot access sufficient funds through bonding or federal grants.

Example:

- Retrofit Chicago: In April 2012, the Chicago City Council passed the nation's first city sponsored infrastructure trust. The Chicago Infrastructure Trust was established as a non-profit 501(c)3 organization with a 5-member voting board and 6 member advisory panel that will select the projects funded through the Trust. Private infrastructure investors have pledged up to $1.7 billion to finance public infrastructure projects in Chicago through the Trust. Public funds can also be brought to the Trust as part of the financing for specific projects.

  The first project financed through the Trust will be the $225 million Retrofit Chicago program that will implement energy efficiency retrofits in over 100 municipally owned buildings. These buildings are projected to experience an average of 20% energy savings that will save the City more than $20 million each year. Some of the energy efficiency measures that will be financed through the Trust include new lighting systems, window replacement and smart climate control devices.

[35] San Diego Gas and Electric: http://www.sdge.com/bill-financing

The investors in Retrofit Chicago will be paid back through the savings in city energy bills over a 15 year period. The investors will take a loss if the savings are not realized. If the savings are more than their initial investment, they would be split between the City and the investors who would make a profit.

The structure of the Retrofit Chicago enables the City to transfer the risk of the project to the investors instead of to the taxpayers as would be done if the project were using traditional municipal finance tools such as bonds. According to Midwest Entergy News 8/31/12, mayoral spokesman Tom Alexander cites the various benefits of this structure, "It is very difficult to finance individual projects in retrofits. The value of this project is the size, collective approach, and the transfer of risk from the taxpayer (as with municipal bonds) to the investor. The Infrastructure Trust is really one of the only ways to do a project of this size and scope. If municipal bonds offer a lower rate, it is due in part to the fact that the taxpayer is taking the risk that the project will deliver the savings."

Chicago's credit rating is lower than in the past. The State of Illinois' finances are in terrible shape, second only to California. And, Federal infrastructure funds are in short supply. According to the City's CFO, the Infrastructure Trust will free Chicago from "complete and total reliance on Springfield and Washington, D.C.".[36]

The Chicago Infrastructure Trust also helps address the discomfort that many feel putting public assets under private control. The Trust, which maintains public ownership but adds private capital, may address these concerns. Concerns about the Trust have been raised due to the City's past negative experiences with public-private partnerships and suspicions about the mayor-appointed board. Critics fear that the Trust's priorities will not reflect the City's most pressing needs and that the City will lose its shirt in the deals; both are legitimate concerns. Chicago's Infrastructure Trust is the first of its kind in the US – there are no precedents to reference – and so it remains to be seen how effectively the city can leverage private capital for the public benefit.

Despite these concerns, Chicago, with a budget deficit of $600 million, is pursuing the Infrastructure Trust because of a lack of funding options. Moreover, this financing challenge is clearly replicated in cities across the country and mayors from San Diego, Louisville, New Orleans, Philadelphia, Kansas City, Denver, Atlanta, Portland and others have been actively tracking the Chicago Trust's progress and are considering using it as a model in their own cities.[37] Time will tell whether the model is worth replicating or not.

[36] Mark Bergen, "As Chicago Approves its Infrastructure Bank, Cities Across the Country Watch and Wait." Atlantic Cities, April 25, 2012. Available at: http://www.theatlanticcities.com/politics/2012/04/chicago-approves-its-infrastructure-bank-cities-across-country-watch-and-wait/1848/

[37] Clinton Global Initiative. " President Clinton Meets with Mayors from Major U.S. Cities to Discuss Job-Creating Urban Infrastructure Banks," August 9, 2012. Available at: http://press.clintonglobalinitiative.org/press_releases/president-clinton-meets-with-mayors-from-major-u-s-cities-to-discuss-job-creating-urban-infrastructure-banks/.

CONCLUSION

Investment in energy efficiency upgrades provides benefits to communities of all sizes. These benefits range from avoided maintenance and operational costs, increased investment in the local economy, local job creation, improved local energy security and reduction in greenhouse gas emissions and other harmful air pollutants. By taking into account baseline information, choosing projects that make sense in the short and long run and choosing the appropriate financing mechanism, any size community can realize lasting benefits from undertaking energy efficiency projects.

ADDITIONAL REFERENCES

Flynn, Emily, Mark Orlowski, and Dano Weisbord. (October 30, 2012). Greening the Bottom Line 2012: http://greenbillion.org/resources/

Freehling, Joel (August 2011). American Council for an Energy Efficiency Economy. *Energy Efficiency Finance 101: Understanding the Marketplace:* http://aceee.org/files/pdf/white-paper/Energy%20Efficiency%20Finance%20Overview.pdf

Geddes, J. (2011, April). Energy Initiative Council Update April 2011. Retrieved May 15, 2012, from City of Reno: Energy Efficiency and Renewable Energy Initiative: http://www.reno.gov/index.aspx?page=2000

Goldberger, Dan. ICLEI. *Profiting From Energy Efficiency!* Retrieved on May 17, 2012, from ICLEI: http://www.iclei.org/index.php?id=1669

Hayes, Sara, Steven Nadel, Chris Granda, and Kathryn Hottel (September 2011). American Council for an Energy Efficiency Economy. *What Have We Learned from Energy Efficiency Financing Programs?* http://www.aceee.org/sites/default/files/publications/researchreports/u115.pdf

Mackres, Eric and Sarah Hayes. (May 2012). American Council for an Energy Efficiency Economy. *Keeping it in the Community: Sustainable Funding for Local Energy Efficiency Initiatives:* http://www.aceee.org/sites/default/files/publications/researchreports/e124.pdf

Reul, Lindsay. (June 2011). The Massachusetts Green Communities Program for Municipal Building Retrofits: Assessing Initial Impacts on Small Communities: http://web.mit.edu/energy-efficiency/docs/EESP_MassGCP.pdf

Brown, Graham, Mike Elchinger, Ryan Flynn and Andy Lubershane, (April 2011) University of Michigan, School of Natural Resources and Environment Masters Project, *Financing Strategies for Municipal Energy Efficiency.* http://deepblue.lib.umich.edu/handle/2027.42/83535

Fulton, Mark, Jake Baker and Margot Brandenburg (March 2012). Deutsche Bank Climate Change Advisors and the Rockefeller Foundation. United States Building Energy Efficiency Retrofits: Market Sizing and Financing Models. http://m.rockfound.org/news/united-states-building-energy-efficiency

ICLEI-Local Governments for Sustainability. http://www.ICLEI.org

American Council for an Energy-Efficient Economy: http//www.ACEEE.org

http://www.Green Biz.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

February 19, 2014

Karen Massey, Chair
Environmental Finance Advisory Board
1200 Pennsylvania Ave., NW
Washington, DC 20460

OFFICE OF THE
REGIONAL ADMINISTRATOR

Dear Chairwoman Massey:

Thank you for your report "Municipal Energy Efficiency and Greenhouse Gas Emissions Reduction: Financing and Implementing Energy Efficiency Retrofits in City-Owned Facilities." Your letter to Gina McCarthy was forwarded to EPA New England for response as we were the office that requested the study. We have worked with the Office of Air and Radiation (OAR) to determine the best way to distribute the report nationally so that it can reach the hands of the local officials who can use the information. OAR's State and Local Climate and Energy Branch will send a message describing the availability of the report via their two newsletters: the State and Local Climate and Energy Newsletter (subscribers: municipal, county, state, federal, and nonprofit staff and contractors) and the State Climate and Energy Program Newsletter (subscribers: state air, energy, and environmental staff, and federal employees).

OAR will also notify EPA's regional air division directors of the report, and EPA New England will distribute the rep011to over 400 communities that are on our Community Energy Challenge e-update list.

These distribution outlets will serve to reach out to local communities with the excellent information provided in the report. Thank you again for your efforts on the Region's behalf to produce this report.

Sincerely,

H. Curtis Spalding
Regional Administrator

cc: Robert Perciasepe, Deputy Administrator
Elizabeth Craig, Director, Climate Protection Partnership Division
Maryann Froehlich, Acting Chief Financial Officer
Michael Shapiro, EFAB Designated Federal Official