AEP Texas CitySmart Program:
A Market Transformation Success Story for Local Governments

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ABSTRACT

The objective of this paper is to describe how the AEP Texas CitySmart pilot program is transforming the market for energy efficiency improvements in Texas cities. CitySmart is a pilot program to help cities and municipal governments identify and overcome the technical, financial, institutional, and political barriers that either delay energy efficiency opportunities or overlook them altogether. Through the early success and best practices of CitySmart, we hope to demonstrate to the reader how similar market transformative approaches and techniques can be applied in the local government sector elsewhere in the country.

This paper is arranged in three sections. Section 1 addresses the key components of the CitySmart process, including energy performance benchmarking; energy master planning; technical assistance to calculate energy and cost saving potential for various technologies; public relations support; and incentive payments. Section 2 provides program performance metrics and achievement during the first pilot year of the program, including number of participating cities; program goals; projected kW demand and kWh consumption reductions generated through completed and planned projects; and incentive dollars paid. Section 3 highlights success stories that illustrate the effectiveness of the program, and lessons learned that others can use when designing and implementing an energy efficiency market transformation program for the municipal sector.

Introduction

Municipal construction and renovation is a rich source of energy efficiency opportunity, due to the aging building stock in our cities, counties and towns. However, in municipalities energy efficiency often falls victim to barriers that include: 1) lack of technical expertise and data necessary to identify and evaluate opportunities, 2) mis-alignment of the internal goals necessary to get disparate and sometimes competing departments to work together to drive energy efficiency improvements; and 3) absence of a mechanism to evaluate the financial returns on cost-effective energy efficiency investments and fund those investments.

To help overcome these barriers, AEP Texas began offering the CitySmart Program on a pilot basis to selected Central and South Texas municipal customers in August 2006. CitySmart is a customized market transformation program that provides the tools and support necessary to realize long term energy savings from a market segment that historically fails to fully utilize established utility programs. CitySmart uses a cross-departmental approach, bringing key finance, facilities, and maintenance personnel together to understand the economic, technical, and environmental benefits of incorporating energy efficiency into new renovation and new construction projects.

The CitySmart Process

CitySmart is offered to selected municipal customers that receive retail electric distribution service from AEP. To join CitySmart, the local government executes a Memorandum of Understanding (MOU) with AEP. In the MOU, the customer agrees to abide by the program rules and commits to exerting their best efforts to implement cost-effective energy efficiency measures.

Under CitySmart, AEP provides the following services:

1. **Energy Performance Benchmarking** - CitySmart benchmarks current energy use with the U.S. EPA's ENERGY STAR® Portfolio Manager® tool. Portfolio Manager provides a rating for the performance of buildings on a scale of 1 to 100, relative to similar buildings. Other benchmarking metrics include kBtu per square foot, cost per occupant, and cost per square foot.
2. **Energy Master Planning** – CitySmart provides each program partner with training and guidance for developing its own Energy Master Plan (EMP). EMPs are designed to overcome entrenched, counterproductive institutional practices (such as installing low-first-cost systems), with better procedures that help the organization make more informed, cost-effective choices.
3. **Technical Support** – CitySmart provides technical support, including help from energy engineers and self-guided estimator tools, to help local governments assess and evaluate various energy upgrade scenarios to determine which scenario is best in terms of life-cycle costs. Once customers define potential projects, they communicate with the program regarding their intention to complete projects and receive incentives.
4. **Financial Incentives and Education** - CitySmart provides financial incentives, based on peak demand reductions that the partner is projected to achieve during the program year. These incentives help the partner to "buy down" the incremental cost of purchasing more energy-efficient equipment that reduces operating costs over the life of the systems and that serves to make a project's simple payback period shorter. While local governments may choose to fund their upgrades with traditional funding sources, CitySmart also educates senior decision makers on how to leverage outside sources of funds through performance contracts, lease-purchase agreements, and third-party financing.
5. **Recognition** - CitySmart provides press releases and other communications support to inform each community about the steps their local government is taking to improve the energy performance of their facilities, reduce operating costs, and use budget dollars more efficiently.

Under CitySmart, the local government partner agrees to do the following:

1. **Identify and assess** energy efficiency measures.
2. **Develop and adhere to an Energy Master Plan** that outlines administrative and financial decision-making criteria for energy efficiency improvements, installation of energy efficiency measures, and maintenance and operation procedures.
3. **Identify and assess** capital-intensive energy projects which will produce energy cost savings.
4. **Identify** funding sources with which to complete projects, using AEP's incentives as a means to help offset the capital cost of projects.
5. **Implement** energy efficient projects.
6. **Allow** AEP program personnel access to the site(s) to conduct pre- and post-construction inspections.

Please refer to Figure 1 below for the CitySmart process flow.

Incentives

CitySmart incentives are available to help offset the cost of installing eligible energy efficiency projects. CitySmart incentives are currently $150 per peak demand[1] kW reduced, based on deemed savings. Deemed savings are the standardized savings values or simple formulas for a range of measures in representative building types. Deemed savings do not require measurement and verification (M&V). The program does not currently pay an incentive for reducing kWh energy use.

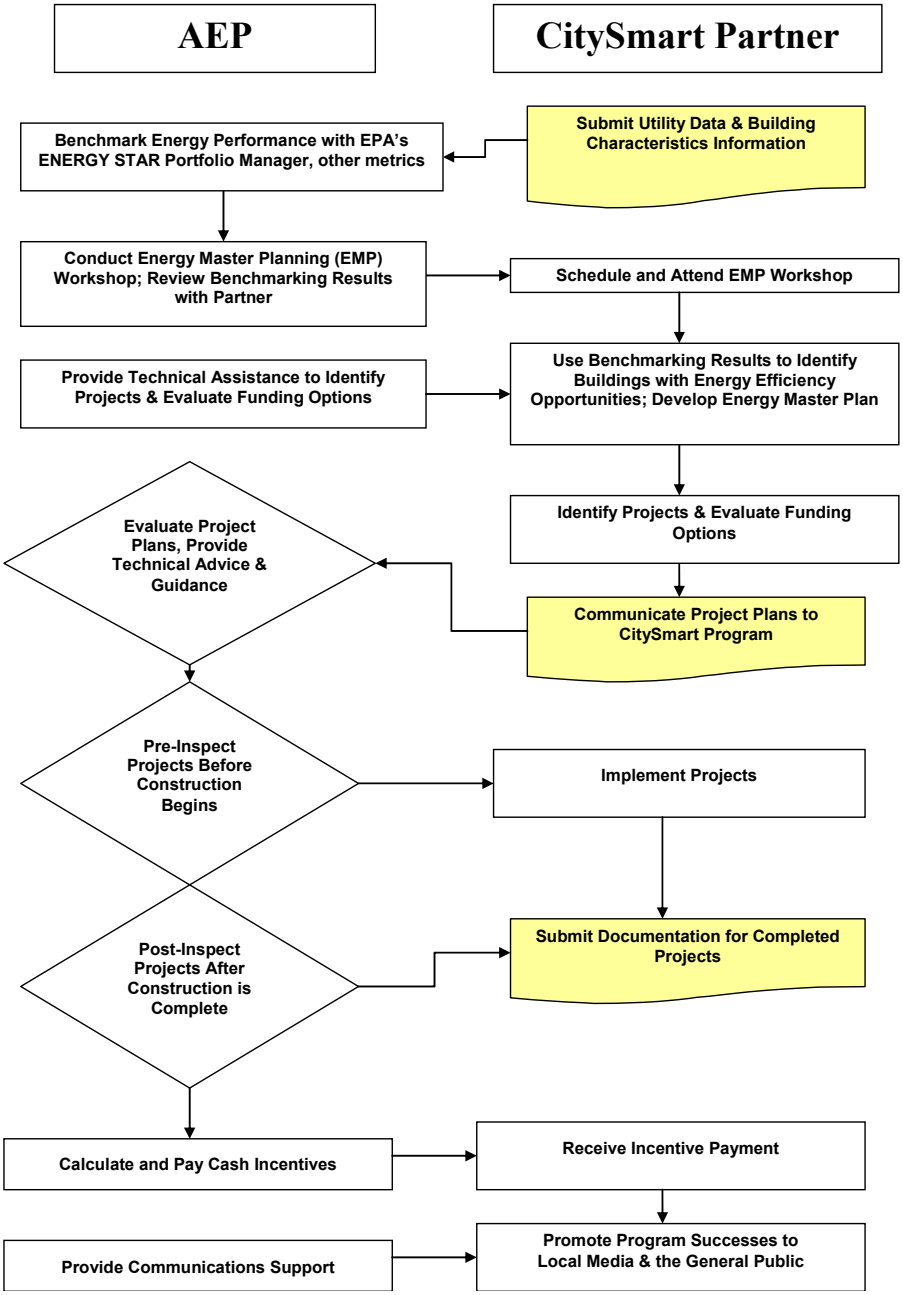


Figure 1. CitySmart Process Diagram

[1] The peak demand period is weekdays between 1:00 pm and 7:00 pm from May 1 through September 30 (excluding holidays).

CitySmart Metrics

During the pilot year, (August 2006 through December 2007), CitySmart recruited ten selected cities in Central and South Texas to join the program. The current CitySmart partners vary in customer size from 285,267 (Corpus Christi) to 2,704 (South Padre Island). Key CitySmart metrics are shown in the tables below.

Table 1. CitySmart Partners by Population, AEP Operating Company

CitySmart Partner	Population	AEP Operating Company
City of Abilene	114,797	AEP Texas North
City of Corpus Christi	285,267	AEP Texas Central
City of Edinburg	66,672	AEP Texas Central
City of Laredo	215,484	AEP Texas Central
City of McAllen	126,411	AEP Texas Central
City of Mission	63,272	AEP Texas Central
City of Pharr	61,360	AEP Texas Central
City of San Angelo	88,300	AEP Texas North
City of South Padre Island	2,704	AEP Texas Central
City of Weslaco	32,092	AEP Texas Central
Totals	1,056,359	

Table 2. Typical Municipal Building Types in the CitySmart Program

Municipal Building Types	
Airport	Office Building
Animal Shelter	Police Department
Civic Center	Pump Station
Coliseum	Recreation Center
City Hall	Senior Citizen Center
Fire Station	Transit Center
Health Center	Water Plant Laboratory & Offices
Library	Water Treatment Plant

Table 3. CitySmart Program Metrics for the 2006-2007 Program Year

CitySmart Program Metric	2006-2007 Program Year
Number of participating cities	10
Total Combined City Population	1,056,359
Total Number of Buildings	about 80
Buildings benchmarked to date	34
Master planning workshops held	4
Projects completed	16
kW demand savings	about 400 kW
kWh electricity reduction	about 700,000 kWh[2]
Incentives paid	about $60,000

[2] Calculated at a blended average of approximately 1,750 kWh per kW of demand.

How CitySmart Helps Break Down Barriers

Energy efficiency in municipalities often falls victim to barriers that include: 1) lack of technical expertise and data, 2) lack of internal goal alignment, 3) lack of a mechanism to evaluate and fund higher efficiency options. CitySmart helps municipalities address these barriers in the following ways:

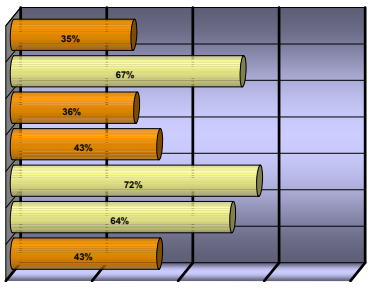
Barrier: Lack of Technical Expertise and Data. Through energy performance benchmarking, CitySmart gives facilities managers the data and training they need to compare the performance of their buildings. This information helps them determine where there are opportunities for performance improvements, and in some cases change misperceptions about which buildings are the best performers. For example, some facilities managers believe that newer buildings built with new technology and under stricter energy codes perform better than older buildings. However, our experience with benchmarking buildings has shown, perhaps counter intuitively, that on a per-square-foot basis, there is no correlation between building age and energy performance. Facilities management staff can see this by doing a side-by-side comparison of buildings in their city using Energy Performance Benchmarking Analyses as shown in Figure 2.

There could be a number of factors that cause this lack of correlation between building age and energy use. For example, the energy savings from better windows and roofs in a newer building could be offset by a greater concentration of plug loads and higher outside air requirements. The lesson for facilities managers is that they should not assume that newer buildings are their best performers, and in fact they should actively seek energy efficiency opportunities throughout their entire building portfolio.

Energy Performance Benchmarking Analysis

		National / TX Regional Average*	Your Score
	U.S. EPA Portfolio Manager Score	50	35
USAGE	Total Energy Use (kBtu/sq.ft.)	102.9	84.1
USAGE	Electric Use (kWh/sq.ft.)	19.6	22.8
USAGE	Cooling Use (kWh/sq.ft.)	3.4	3.7
USAGE	Gas Use (Kbtu/sq.ft.)	12.9	6.4
COST	Total Energy Cost ($/sq.ft.)	$2.87	$2.60
COST	Total Energy Cost ($/occupant)	$891	$1,164

* Average for buildings in similar climate regions of the state.



Building Characteristics		Energy Use/Cost Data	
Year Built	1966	Beginning Billing Month	January-06
Floor Area (sq. ft.)	60,410	Ending Billing Month	December-06
Number of Occupants	135	Electricity Usage (KWh)	1,376,633
Number of PCs	242	Electricity Cost ($)	$153,604
Type of Heating System	Gas Heating Only	Natural Gas Usage (therms)	3,851
Weekly Operating Hours	40	Natural Gas Cost ($)	$3,498
		Total Energy Cost ($)	$157,102

Figure 2. CitySmart Energy Performance Benchmarking Analysis

CitySmart also provides partners with energy engineering support to help evaluate energy efficiency alternatives for lighting, space conditioning, and water heating. The program's engineers are up-to-date on current technologies and their applications, and we work with partners to help them assess, compare, and quantify the value of various technology alternatives. The technical support is trusted by partners because the program does not prescribe any particular technology, brand or vendor. Rather, the technical support provides a means by which the CitySmart partner can objectively evaluate technical solutions and choose the right ones for their municipality.

Barrier: Lack of Internal Goal Alignment. Municipal departments are typically budget-driven, with little or no alignment of budgetary or performance goals across departmental lines. The CitySmart master planning process brings senior managers (including department heads, senior financial officials, and city administrators) together to focus on how they can collectively take advantage of energy efficiency opportunities, regardless of where those opportunities exist in the organization. For example, at the master planning workshop, participants complete a "scorecard" that gauges how well departments communicate, whether their respective goals are in line, how energy usage is accounted for, and how energy efficiency decisions are made.

The principal objective of the master planning workshop is for partners to examine how they operate with respect to energy efficiency and identify gaps in their process. Using the answers on the scorecard, we encourage them to create an energy master plan with common goals, objectives, projects and timelines. This process helps generate cross-departmental consensus on immediate project funding priorities while instituting a planning philosophy that integrates energy efficiency into future construction and renovation projects. Once finalized, we encourage the partner to present the master plan to their City Council for formal approval, which gives the plan the weight it needs to generate buy-in and commitment from staff.

Barrier: Lack of a Mechanism to Evaluate and Fund Higher Efficiency Options. In working with cities throughout the first year of the pilot, we realized that facilities managers do not have a good way to evaluate the financial return on energy efficiency investments. Equipment specifications for retrofit or new construction are usually recommended by consulting engineers, with first-cost considerations outweighing energy efficiency benefits. To give facilities managers and business officials a better understanding of the economics of higher-efficiency choices, we developed the CitySmart Energy Upgrade Estimator, which compares equipment efficiency choices using a "good-better-best" approach, and the CitySmart Booster Heater Model, which provides a simple energy- and cost-savings analysis of replacing gas-fired kitchen water booster heaters with electric booster heaters. Using the partner's specifications on existing and proposed equipment, we use these tools to help partners calculate the energy and cost savings benefits of choosing the higher-efficiency option.

Another tool we use to illustrate the benefits of energy efficiency investments is a graphical comparison of risk and return on investment choices. As shown in Figure 3, a four-year simple payback on an energy efficiency investment can return about 25% (similar to or greater than small company stocks in a good market) with a risk index of 5% or less (similar to the risk of investing in US Treasury bills).

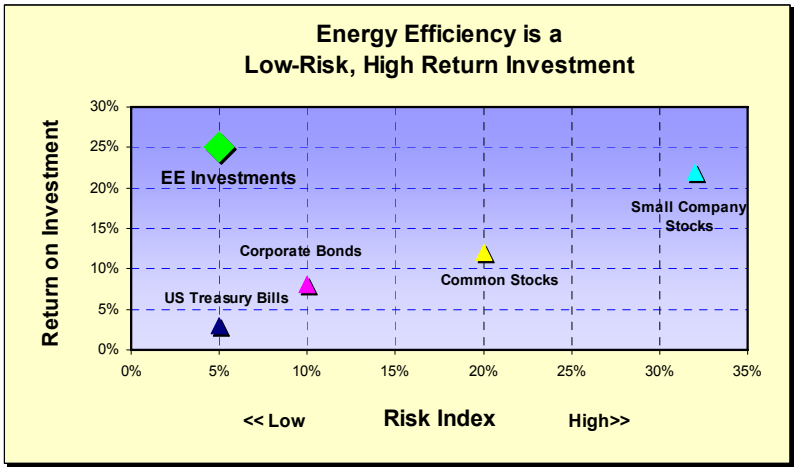


Figure 3. Energy Efficiency Investment Risk-Reward Comparison

Regarding funding, there is a perception in many cities that money must be available in the current budget for energy efficiency projects. Many projects stall due to one or a combination of the following perceived financial barriers:

- If the project is not in this year's budget, it has to wait.
- Equipment improvements must be paid from the capital budget.
- Paying lower interest (by floating bonds) or no interest (by delaying the project and planning it into future budgets) saves money and, therefore, is in the best interest of the organization.
- Taxes or fees will have to be increased to pay for the improvements.
- Performance contracting is expensive and unreliable.
- Tax-exempt lease-purchase is expensive and may be prohibited by law.

In addition to helping city officials understand the benefits of the higher-efficiency choice, we also help them find ways to overcome these barriers by educating them on alternative purchasing and financing options. During the master planning workshop we present information on the opportunity cost of delaying energy efficiency upgrades, we review the risk-return profile of energy efficiency improvements relative to other investment options, and we present alternative financing models such as capital and operating leases, performance contracts, tax-exempt lease-purchase agreements, and third-party financing.[3]

There is a common perception in the public sector that it is financially prudent to wait for a future year's budget or a bond issue rather than financing a project (and incurring interest) with funds that may be more readily available. However, by delaying the project, the organization forgoes the opportunity to accrue substantial savings on their energy bill that ***more than offset the financing cost***. For example, a $500,000 project has a 5-year simple payback, which equals a savings of $100,000 per year. If the project were financed over 7 years at 7% interest, the total interest paid would be about $90,500, or about $9,500 ***less*** than the energy savings that the school district passed up by delaying the project ***for just one year***.

CitySmart Success Stories

The CitySmart Program spans a large geography throughout Central and South Texas. The following are just two examples of CitySmart partners who have taken full advantage of the program's resources to help them benefit in the current year, as well as setting themselves up to draw on the program's technical support and guidance in the coming year.

The City of South Padre Island

The City of South Padre Island is a small city, with a significantly smaller budget for construction and renovation than other CitySmart partners. However, South Padre Island believes that the size of city has no bearing on the ability to reap the benefits of energy efficiency in new construction and renovation projects. South Padre Island has a champion, City Manager Dewey Caswell, who sees it as his mission to make the city's facilities as energy efficient as fiscally possible.

Upon joining CitySmart, we worked with the city to evaluate new construction and renovation plans for several city facilities. For the new City Hall, CitySmart engineers evaluated the building plans and found an opportunity to replace 130+ incandescent light fixtures with CFLs. This simple design change will save the city more than 10 kW and $3,900 per year in electricity costs, paying for itself in one to two years. CitySmart is also working with the city to review plans and make energy efficiency recommendations on lighting, HVAC, roofing, and any other cost-effective technologies for the renovation of the old City Hall building.

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[3] Hatcher, Katy. 2004. "Innovative Financing Solutions: Finding Money for Your Energy Efficiency Projects – A Primer for Public Sector Energy, Facility, and Financial Managers from the U.S. Environmental Protection Agency's ENERGY STAR® Program." US EPA.

The City of Abilene

The City of Abilene did not have a budget allocated specifically for energy efficiency projects. However, city administrators were interested in determining the best way to leverage taxpayer funds to obtain long-term energy and cost savings for the city. To do so, the city created an Energy Conservation Committee (ECC) made up of representatives from a number of city departments including the City Managers office, Construction, Finance, Parks & Recreation, Facilities, Maintenance, and Economic Development. These individuals meet throughout the year to discuss multi-departmental needs, strategies, and approaches to using budget dollars as effectively as possible to accomplish their individual and collective project goals.

After joining CitySmart, the ECC asked for assistance in helping the city procure energy services through a competitively-bid performance contract from an Energy Services Company (ESCo). CitySmart was seen by the city as an impartial, third-party way to obtain needed advice about the procurement, as CitySmart personnel have experience in performance contracting and scoping energy efficiency improvement projects. Throughout this process, CitySmart has helped the City of Abilene by:

- Making recommendations about how to review ESCo bids
- Benchmarking city buildings to determine those buildings that should receive particular attention during the ESCo scoping process
- Working with ECC members to better define their current facility's status and how the performance contract can deliver long term life cycle benefits
- Reviewing ESCo deliverables (facilities to be targeted for retrofitting, and proposed equipment, technologies, and efficiency ratings to be installed)

Further, the selected ESCo was brought into the CitySmart program process so that the ESCo could:

- Understand the ECC member's collective and individual needs and priorities;
- Gain a better understanding of the city's short- and long-term energy goals before they developed a proposed scope of work for energy efficiency improvements;
- Understand how CitySmart assists both the city and the ESCo by promoting a high level of energy efficiency through projects that yield kW demand, kWh, and cost savings for the city.

In addition to these success stories, CitySmart has had a positive effect on the service provider market. We have found that ESCos and equipment vendors who have had experience with the program and seen how their clients have benefited from it have been promoting CitySmart to other clients and business prospects. This spillover benefit is helping to transform the market for how service providers help their clients maximize the value of their energy efficiency efforts.

Lessons Learned in Year 1 of CitySmart

Municipal energy efficiency market transformation programs can be difficult. A number of factors unique to the municipal sector affect the ability for any market-transformative program to quickly influence institutional planning for energy efficiency, investment decisions, equipment selection, and installation. They include:

1. Planning and investing is a multi-year process that takes time to influence, particularly across departmental budgets and particularly in new construction.
2. Decisions driven by budget are often different than decisions driven by profit.
3. Decentralized authority and lack of goal alignment affect the decision-making process.
4. Information is power, but only if organized in a manner that is useful and then used.

Observations Going Forward

Be Patient, Think Long-Term. The best energy efficiency programs are multi-year efforts in which the early years build market credibility and momentum, so that the later years yield the benefits desired. Particularly in the municipal sector (even to a greater extent than in the K-12 sector) planning and investing is a multi-year process that takes time to influence, particularly across departmental budgets and particularly in new construction. Because of the enormous opportunity for energy efficiency in this sector, however, it pays to be patient, work diligently to educate and earn the trust of municipal leaders, and reap the long-term benefits of energy savings generated through programs like CitySmart.

Financial Education is Key. Since energy investment decisions are driven mostly by pre-determined budgets, it is important to talk early and often about the financial opportunities inherent in energy efficiency improvements. The objective is to introduce risk-return concepts and opportunity cost calculations into the decision-making process, so that senior officials begin to treat energy efficiency as an investment opportunity instead of an operating or capital expense. This would also help facilities managers when they do not have the financial background necessary to make the case for energy efficiency as a wise investment decision.

Bring the Key Players Together, Keep Them Talking. To the greatest degree of any market sector we work with, the municipal market sector has the least amount of natural internal communication around energy efficiency. The Energy Conservation Committee at the City of Abilene is a great model of inter-departmental communication and cooperation, but it is unfortunately rare to find such a group in a city. Forming such a committee to meet regularly to analyze building performance, create and monitor energy master plans, and prioritize energy efficiency improvements, is an excellent way to establish permanent working relationships to the betterment of energy performance in a city.

Organize Data, Keep it Up-to-Date. As we work with cities, it is sometimes surprising to learn how little they know about their energy usage. Bills are typically reviewed by facilities personnel and forwarded to accounting for payment, but the data contained in them is rarely analyzed for savings opportunities. With deregulation in Texas, it seems that more attention is paid to securing the best deal for energy supply than actually understanding how much and where the energy is used. One of the major challenges in Year 1 has been getting energy usage data from CitySmart partners (under deregulation in Texas, AEP is the electric delivery company but not the billing agent and therefore cannot provide complete electricity use and cost data directly to CitySmart). Despite this handicap, once a partner provides their energy use and building data CitySmart has helped them organize the data so that they understand how much they use and where.

References

Hatcher, Katy. 2004. “Innovative Financing Solutions: Finding Money for Your Energy Efficiency Projects – A Primer for Public Sector Energy, Facility, and Financial Managers from the U.S. Environmental Protection Agency’s ENERGY STAR® Program.” US EPA.