

Breaking Down Silos: Bridging the Communications and Knowledge Gap between Departments to Implement Energy Efficiency in the Public Sector

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ABSTRACT

Over the last three years, 60 school districts and local governments in seven utility service territories in Texas have been engaged in market transformation programs that bring together disparate departments to discuss how their organizations currently manage energy usage and set priorities for controlling energy costs. During the process, department managers collect energy use and building characteristics data, attend an energy master planning workshop, complete a management performance scorecard to compare their approach to energy issues to industry best practices, and develop an energy master plan that maps out how they will make strategic decisions regarding their energy use.

In this paper we will first present how this process has caused public sector entities to discover how organizational divisions and lack of communication between departments prevent energy management from becoming a priority within organizations. Next, we will describe how the process opens new lines of communication between departments so that all groups understand how they can work together to reduce energy costs. Third, we will outline lessons learned and provide examples of how disparate departments have worked together to overcome the communication and organizational barriers that kept energy efficiency and energy management from attaining high priority status. Finally, we will discuss how this approach can be applied to other programs around the country.

Note to the reader: The information presented in this paper represents findings and lessons learned by the authors during the implementation of public sector energy efficiency market transformation programs in Texas over the last three years. While we believe that the institutional and financial barriers presented in the paper are common to public sector organizations elsewhere, it was outside the scope of this paper to compare the Texas experience to that of similar market transformation programs. To our knowledge, no similar, vertically-integrated, programmatic approach to public sector energy efficiency has been implemented anywhere in the country.

Introduction

Public sector construction and renovation offers a vast source of energy efficiency opportunity, due to an aging building infrastructure in our schools, cities, counties, and towns. However, in the public sector, energy management is often given a low priority because of the misalignment or lack of the internal goals necessary to get disparate and sometimes competing departments to work together to drive energy efficiency.

To help overcome this barrier, the Schools Conserving Resources (SCORE) and CitySmart Programs were created. These programs are being offered on a pilot basis in seven utility service territories in Texas to selected public sector customers. SCORE and CitySmart are

customized market transformation programs that provide the tools and support necessary to realize long term energy savings from market segments that historically fail to fully participate in utility energy efficiency programs. Both programs use a cross-departmental approach, bringing key decision makers from finance, facilities, maintenance and other departments together to help them better understand the economic, technical, and environmental benefits of incorporating energy efficiency into retrofit, major renovation, and new construction projects.

Barriers to Energy Efficiency in the Public Sector

Working with public sector organizations throughout Texas since early 2006, we have found a number of common barriers that inhibit the systematic evaluation, funding, and implementation of cost-effective energy efficiency measures. These barriers, discussed in further detail below, include lack of communication and internal goal alignment, lack of technical expertise and data, and lack of mechanisms to evaluate and fund higher efficiency options.

Barrier: lack of cross-departmental communication and internal goal alignment. In cities and school districts throughout Texas, we have found that the greatest single factor inhibiting public sector energy efficiency is not funding or technical expertise, but whether the organization has senior level, cross-departmental commitment to using energy efficiently. Our experience is that more often than not, departments within these public sector organizations operate as individual silos and do not effectively set or communicate energy efficiency goals across departments. In addition, our experience working with hundreds of public sector entities in Texas, Virginia, Nevada, New York and Arkansas is that they are budget- and first-cost-driven, with little or no alignment of budgetary or energy performance goals across departmental lines.

Barrier: lack of technical expertise and data. In 80% of the public sector entities we work with, there is no single person responsible for energy efficiency and energy performance. Our program partners tell us this is because personnel resources are stretched thin, so staff has multiple responsibilities. As a result, it is difficult for internal staff to dedicate the time necessary to effectively analyze energy use and cost data, report on the performance of their buildings, take corrective action as needed, and keep up with changes in technology that can improve the energy efficiency of their organizations.

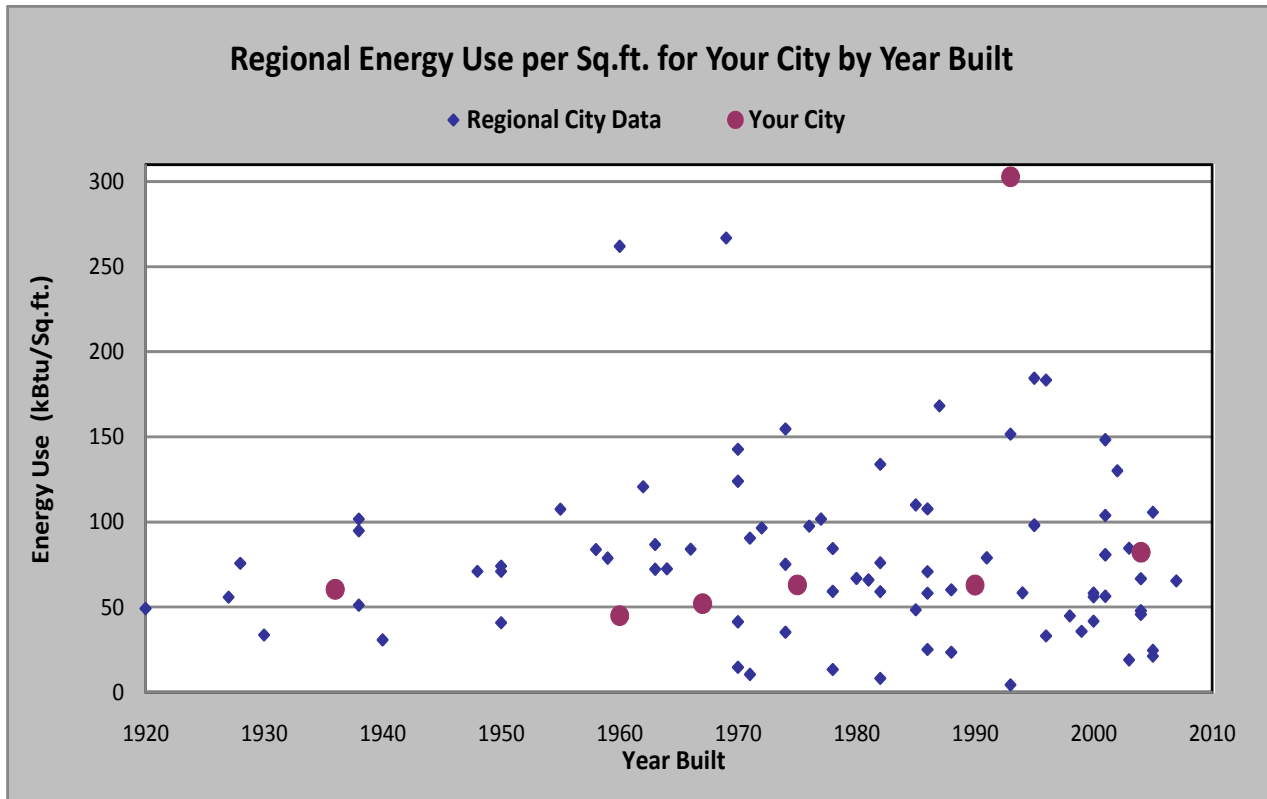
Barrier: lack of mechanisms to evaluate and fund higher efficiency options. In the dozens of best-practices Energy Master Planning workshops we have conducted with SCORE and CitySmart partners, we have discovered that only in very rare cases do facilities managers and financial decision-makers have any methodology to evaluate the life-cycle benefits of energy efficiency investments. In addition, procurement rules in public sector organizations typically require bids to be awarded on lowest cost. If solicitations do not allow for (or in fact discourage) alternate bids for higher-efficiency equipment, the city or school district has no way to entertain alternatives that could yield much higher savings over the life of the equipment.

SCORE / CitySmart Program Components

Energy performance benchmarking. Through energy performance benchmarking, SCORE and CitySmart give facilities managers and departmental managers the data 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 argue against misperceptions about which buildings are the best performers. For example, some department 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. This is shown in Figure 1 below, where a city's per-square-foot energy use by building is compared to similar buildings in the same climate region in Texas.

Figure 1. Comparison of Energy Use by Year Built



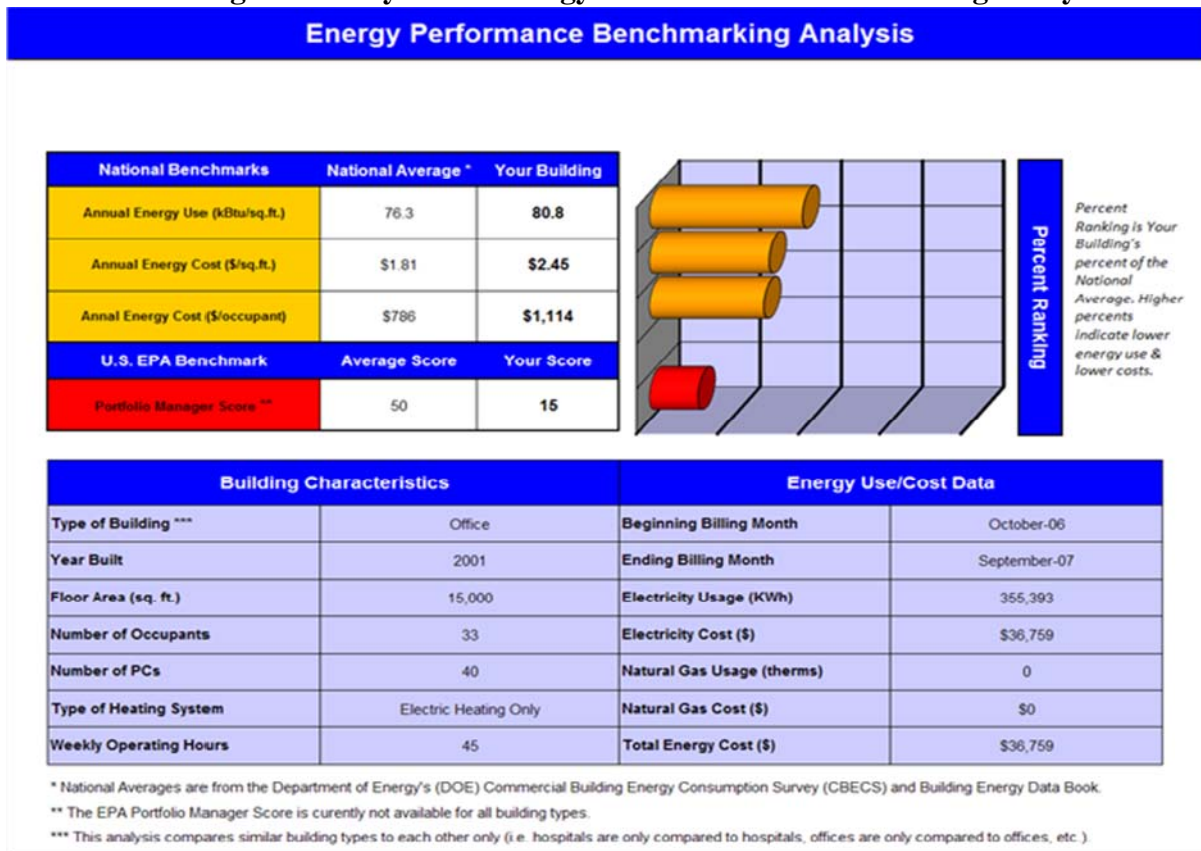
(Source: CLEAResult Texas CitySmart Database)

There are a number of factors that cause the 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 management 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.

At the building level, public sector managers can also make side-by-side comparisons of buildings in their organizations using the type of building-level Energy Performance Benchmarking Analysis shown in Figure 2. This analysis is similar to work that was done in

New York under NYSEERDA's Energy Smart Schools Program¹ and in Wisconsin under WECC's Focus on Energy Program.²

Figure 2. CitySmart Energy Performance Benchmarking Analysis



Energy master planning. The SCORE and CitySmart Energy Master Planning process brings senior managers (including department heads and senior financial officials) together to focus on how they can collectively take advantage of energy efficiency opportunities, regardless of where those opportunities exist in the organization.

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 processes. The Energy Master Planning process guides them through the process of creating an energy master plan with common goals, objectives, projects and timelines. The goal of this process is to help 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, the partner is encouraged to present the master plan to their school board, city council, or governing body for formal approval. We believe that this is an effective driver to get the plan implemented, as partners have told us that anything endorsed by their board or council is seen as a priority by staff.

¹ <http://www.nyserda.org/programs/schools/BuildingDataRequestForm9-19-07.pdf>

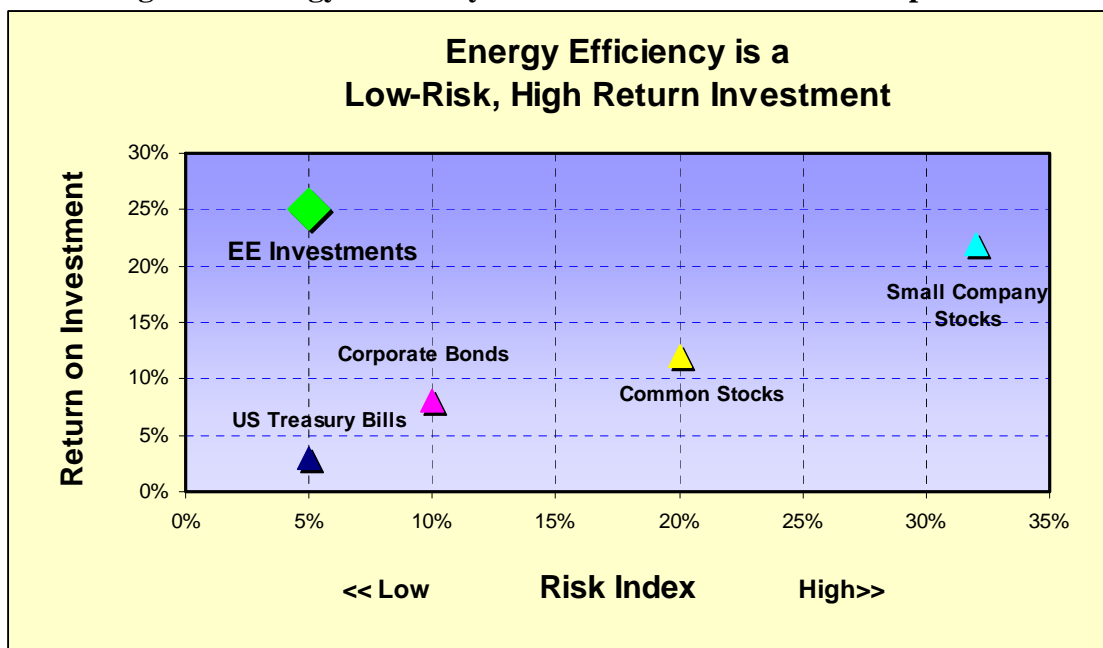
² http://focusonenergy.com/files/Document_Management_System/Business_Programs/B_SG_MKFS_SchoolsandLocalGovFShv2.pdf

Technical support. SCORE and CitySmart also provide partners with energy engineering support to help evaluate energy efficiency alternatives for various forms of lighting and traffic signals, space conditioning, roofing, windows, 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 provides a means by which the program partner can objectively evaluate technical solutions and choose the right ones for their organization. To give facilities managers and business officials a better understanding of the economics of higher-efficiency choices, we developed the SCORE and CitySmart Energy Upgrade Estimator, a tool that compares equipment efficiency choices using a “good-better-best” approach. Using the partner’s specifications on existing and proposed equipment, partners can use this tool to calculate the energy and cost savings benefits of choosing the higher-efficiency options.

Financial incentives and education. Both SCORE and CitySmart provide 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 can help reduce operating costs over the life of the equipment. SCORE and CitySmart also provide information to senior decision makers on how to leverage outside sources of funds through performance contracts, lease-purchase agreements, and third-party financing.

Another tool used in these programs to illustrate the benefits of energy efficiency investments is a graphical comparison of risk and return on investment choices. This type of graphic has been used in other programs, including the U.S. EPA ENERGY STAR Program. 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 U.S. Treasury bills).

Figure 3. Energy Efficiency Investment Risk-Reward Comparison



Regarding funding, we have learned from our partners that cost-effective energy efficiency projects stall due to one or a combination of the following 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 imposed on the public 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 public sector managers understand the benefits of the higher-efficiency choice, the program helps them find ways to overcome these barriers by educating them on alternative purchasing and financing options. During the Master Planning Workshop, participants get information on the opportunity cost of delaying energy efficiency upgrades and they learn about alternative financing models such as capital and operating leases, performance contracts, tax-exempt lease-purchase agreements, and third-party financing.

Among the program partners, we have found that in almost every case they 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 organization passed up by delaying the project *for just one year*.

Recognition. The SCORE and CitySmart Programs provide several forms of communications support for the program participants to inform each community about the steps their school district or local government is taking to improve the energy performance of their facilities, reduce operating costs, and use budget dollars more efficiently.

Communications support includes press releases in local media outlets acknowledging school district and local government partners when they join the programs and at the end of the year when the sponsoring utility provides the incentive check at a school board or city council meeting for the savings achieved through energy efficiency projects over the program year. Our partners have told us that these press releases are valuable to them because: 1) they provide recognition for staff members within the school district or city government for their efforts; 2) they provide greater visibility of the program and the partner's energy efficiency efforts at all levels of the partner's organization; and 3) they demonstrate to the local community that the school district or local government is being a good steward of taxpayer dollars while reducing its environmental footprint.

In addition, the programs provide periodic newsletters and case studies highlighting select energy efficiency projects that program partners complete while participating in the program. Topics covered include areas such as facility improvements, energy savings, financial incentives paid by the sponsoring utility and financial paybacks on projects.

SCORE / CitySmart Texas Success Stories

The following are examples of school districts and local governments in Texas that are using the SCORE and CitySmart Programs to help them elevate energy efficiency to a higher priority within their organizations. The school district and city names have been changed to generic names so that we may share their experiences while protecting their identities.

Independent School District #1 (ISD1). We have been working closely with ISD1 in the SCORE Program since July of 2006. Through the process, we have completed benchmarking reports and facilitated the development of an Energy Master Plan for the district. In January 2008, ISD1 created the Go Green Committee (GGC), whose mission is to recommend best practices for constructing, renovating, and operating schools that are efficient and environmentally friendly while enhancing the quality of the educational environment. The GGC is also charged with educating the community about the importance of energy conservation.

The Go Green Committee's responsibilities are as follows:

- Review best practices for constructing high performing, energy efficient, and sustainable schools; recommend school building design standards that will heighten student performance, conserve energy and reduce operating costs; provide a healthy, safe, and comfortable school environment; and minimize negative impacts on the outdoor environment.
- Regularly compare ISD1's current energy consumption (electricity, natural gas, water, and waste water) with schools of similar characteristics in the Gulf Coast region; recommend ways to decrease ISD1's energy consumption.
- Recommend ways to increase recycling and to decrease disposable waste in ISD1's facilities.
- Review best practices for maintaining and operating school buildings efficiently and effectively; review ISD1's Energy Management Plan and Energy Conservation Guidelines; make recommendations for improving both documents.
- Identify new and emerging energy conserving measures that have a payback of 10 years or less.
- Implement one, district-wide energy conserving activity and encourage each campus to initiate energy conserving activities.
- Develop a communication and education plan for sharing energy conserving and recycling best practices with students, staff, and the community.
- Recommend vehicle and equipment purchases that are energy conserving and environmentally friendly.

In addition, ISD1 is currently working to set up an energy conservation fund to serve as a repository for all utility incentive dollars. These incentive dollars would be used to fund additional energy efficiency projects. The creation of this fund is unique in the public sector; our partners tell us that utility incentive dollars are almost always deposited in the organization's general fund and not specifically dedicated to energy efficiency improvements like the ISD1 incentives will be.

Independent School District #2. After ISD2's senior management from various departments reviewed the district's SCORE benchmarking reports, the low scores relative to their peers motivated them to make energy efficiency a priority across the district. One step ISD2 took was to create an energy management task force in the summer of 2007, comprised of key decision makers from facilities, maintenance, finance, information technology, and transportation, as well as school principals and outside consulting firms. In addition, ISD2 used the data to justify creating an energy manager position in the district and hired an experienced energy manager who is tasked with identifying energy saving opportunities and reducing energy consumption. Since creating the energy manager position and the energy management task force, ISD2 has been proactively working to identify and implement energy saving opportunities. Energy efficiency projects planned in the district for 2008 include high efficiency HVAC upgrades, lighting retrofits, window film, and high performance design on new construction projects. These projects are estimated to save 815 kW, equivalent to the typical peak electric demand of two 70,000 square foot elementary schools.

Independent School District #3. ISD3 joined the SCORE Program in 2007. The Energy Management Department had spent 10 years trying to convince district management to move forward with cost-effective lighting retrofits in the district. We conducted an Energy Master Planning session with senior management and other key personnel in the district, and followed up with technical and financial analysis on potential lighting projects. After fully grasping the opportunity cost of not completing the lighting project, district management decided to set aside a specific budget for district lighting retrofits and is currently testing several lighting designs in their schools before proceeding with full implementation.

City #1. City1 joined the CitySmart Program in 2007 and we were able to engage the city manager, assistant city manager, and the finance office from the beginning of the relationship. In this process we identified opportunities at two new fire stations that were in the planning stages. Reviewing the plans, we were able to educate the key decision makers on the benefits of increasing efficiency on the lighting and HVAC systems in these new facilities. City1 had the financial payback information they needed to make the decision to move forward with incorporating the high efficiency design elements into these two new facilities. We then worked with City1 to identify other energy saving opportunities in existing buildings that could benefit from more efficient lighting. City1 has since completed a lighting retrofit on a large warehouse, replacing 1,000 watt metal halide fixtures with T-5 lighting.

City #2. While City2 is relatively new to the CitySmart Program, discussions on energy efficiency with management from key departments resulted in a traffic light retrofit project that will take place in 2008. Additionally, the city is considering adopting high performance design standards into their new construction project plans. Again, we have seen the importance of engaging the key decision makers across multiple departments early in the program process in order to secure the needed support to move energy efficiency projects to priority status.

Lessons Learned

A unique set of circumstances exists in the public sector that affects the ability to quickly influence institutional planning for the investment in energy efficiency. These factors include:

- Planning and investing is a multi-year process that takes time to influence, particularly across departmental budgets. This is especially true in new construction.
- Spending criteria and decisions involving public funds and budgets often differ greatly from spending criteria and decisions made by private sector businesses.
- The decision making process is often affected by decentralized authority and lack of goal alignment.

Bring the key decision makers together and help them create an open line of communication. Public sector organizations in Texas are highly departmentalized, and we have observed that these departments do not tend to naturally interact in a way that encourages cross-departmental goal setting around energy efficiency. Because of this, we believe that it is critical to: 1) get the key decision makers from departments such as facilities, maintenance, and finance involved early in the program; 2) create a forum which encourages these decision-makers to communicate regularly; and 3) set cross-departmental goals around energy management. This has worked so successfully in several cases that program partners have established standing inter-departmental energy management task forces to focus on energy efficiency. Though we have found that the SCORE and CitySmart process is one way to help establish this open line of communication across departments, the programs may not be universally effective in bridging this communications gap. The degree to which this is successful depends on organizational culture, interpersonal working relationships, and the vision and expectations of the organization's leadership.

Financial education is paramount. Since energy investment decisions are driven mostly by pre-determined budgets, it is important to talk early and often to key decision makers across departments about the financial opportunities inherent in energy efficiency improvements. This can be done by introducing risk-return concepts and opportunity cost calculations into the decision-making process, so that senior officials view energy efficiency as an investment opportunity instead of an operating or capital expense. SCORE and CitySmart tools such as the Energy Upgrade Estimator have helped Texas facilities managers, who rarely have a financial background, evaluate various equipment efficiency options and paybacks associated with each of them. This analysis also helps equip facilities managers with the information necessary to make the financial case for higher levels of energy efficiency to key decision makers.

Establish a process to keep data organized and up to date. We were surprised to learn how little most of the SCORE and CitySmart partners in Texas know about their energy usage and costs. Bills are typically reviewed by facilities personnel and forwarded to accounting for payment, but the data contained in them is rarely analyzed for accuracy, usage trends, and savings opportunities. With deregulation in Texas, we have found that more attention is paid to obtaining the lowest price for energy supply than to seeking to fully understand how much and where the energy is used. Most of the program partners did not readily have the data necessary to benchmark their facilities' energy use and costs. It was rare that these entities collected and maintained this information in a centralized location where it could be analyzed for accuracy and reviewed for energy savings opportunities. Through participation in SCORE and CitySmart, many partners gathered and organized their data for the first time, enabling them to better understand how their facilities are using energy, how that usage compares to other buildings in their organization, and how to create a process to keep this data organized and up to date.

Create competition among regional school districts and among local governments. We have found that school districts, cities, towns, and counties in Texas can be very competitive with neighboring jurisdictions. These entities do not want to be perceived as lagging behind their counterparts. The programs have created healthy rivalries between school districts and local government partners by publicizing their energy efficiency successes. When a school district or local government creates an energy management task force or an energy conservation fund, installs high efficiency equipment in its facilities, or adopts high efficiency design standards for new construction and renovation projects, the programs publicize this information as a way to inform the public and motivate neighboring jurisdictions to do the same.

Leverage established and recognized initiatives. When working with public sector entities, we have found that it is helpful to identify regional or national programs or initiatives in which our Texas partners can participate. For example, SCORE and CitySmart encourage partners to apply for certification and/or recognition in widely-recognized programs like the ENERGY STAR Label for Buildings or Leaders Awards, as well as LEED and other green building programs. To facilitate this, SCORE and CitySmart benchmarking processes use the EPA's Portfolio Manager Tool to calculate a score that can qualify Texas buildings for an ENERGY STAR label, or a group of buildings for an ENERGY STAR Leaders Award.