

Instructions

*This year's format is slightly different from last year. If you participated last year, you will remember that each case had one case partner and was written from their specific perspective. This resulted in solutions that were very useful to the case partner, but not necessarily replicable to other organizations. This year, many case partners were consulted to give a broader perspective on endemic energy efficiency implementation barriers. **Accordingly, this year's cases describe "typical" versions of problems, and your solutions will be judged on innovation and replicability.***

Each case provides information that reflects the most common elements of the problem and some contextual assumptions. But in real life, every instance of a problem can be different. Therefore, you have two options for developing your solutions:

- 1) You can select one or more real-world examples, and use the specifics of their situation to inform your solution OR*
- 2) You can propose a general solution based on the assumptions provided in the case text and create additional assumptions as needed.*

Under either option, solutions will be judged for innovation and replicability. Therefore, if you choose to focus on a specific real-world example, you should indicate where aspects of your solution might be adapted or changed to be more broadly replicable.

In addition, any assumptions that you change or add must be clearly stated, and the sources cited in your case solution. If you use an example(s) that has different parameters than the assumptions in the case, or if your proposed solution requires changes to the case parameters, you must explain the impact of these differences on the solution's success or replicability.

Introduction

A city's approach to energy management in its public buildings plays a critical role in the way energy efficiency measures are prioritized, benefits are allocated, data and results are communicated, and energy efficiency investments are perceived within the organization. There are multiple barriers to cost-effective energy management. For one, the responsibility of energy efficiency is often shouldered by time and resource constrained operations and maintenance staff, who must ensure the safety and maintenance of their buildings while responding to a continuous stream of tenant requests. This leaves little time to focus on building energy performance, identify opportunities for improvement, and implement energy efficiency measures.

Individual buildings do not always have designated management staff, and those that do, may have staff that manage multiple buildings. Additionally, facility staff may not have basic energy management training or awareness of new technologies, and may not know how to properly operate their equipment to maximize energy savings potential. Individual buildings, or separate agencies within a city, are also often not directly responsible for utility bills. Therefore, any cost savings realized in their buildings as a result of energy efficiency often return to city general funds, removing the incentive for buildings or agencies to prioritize energy use reduction. Together, these issues have created barriers to implementing cost-effective energy efficiency measures in public buildings. A shift from "reactionary" building management to a proactive approach may be required to realize energy efficiency savings.

The Challenge

You are the energy manager of a mid-sized U.S. city. Your city has joined the U.S. Department of Energy's Better Buildings Challenge program and set a voluntary 10-year, 20% energy reduction goal, based on a 2011 baseline. The city has yet to identify specific strategies toward achievement of this goal. Your responsibility is to help the city meet the 20% energy use reduction goal, and you see a significant opportunity in improving the energy efficiency of the city's public buildings. The city has 150 publicly owned buildings, most concentrated downtown and some scattered within the city limits.

The mayor has set aside a multi-year special projects budget and is requesting proposals from agencies and offices to compete for the funds in addition to their respective base budgets¹. Your office would like to compete for the additional funds in order to achieve energy efficiency in its public buildings while simultaneously working toward the Better Buildings Challenge goal.

To accomplish this, you must recommend a scalable, sustainable, and replicable energy data tracking and energy management strategy for the city's portfolio of owned public buildings. The strategy proposed must address the following: (1) the key roles and responsibilities across the city organization; (2) how building energy data will be collected and used; (3) how energy efficiency projects will be discovered, prioritized and financed and; (4) how to empower and incentivize operations and maintenance staff to manage energy use and associated costs, and maintain energy savings over time.

¹ This is in addition to the capital improvement budget and would cover special projects such as fleet upgrades, portfolio broadening, cost saving investments, etc.

Cost-effective proposals, and those with significant cost sharing components, will be viewed favorably by the mayor. The city would also like to highlight successful programs to stakeholders, so defining program goals, timelines, and methods for communicating results is important. A reasonable strategy will address actions going forward 10-20 years and include milestones. To develop your proposal, consider which city decision-making formats and processes create opportunities to integrate energy efficiency recommendations and how energy goals might become engrained in the culture of the city's decision-making.

Changes to city policy can be recommended in proposals but must be supported by realistic strategies. It can also be assumed that any department restructuring activities, such as reorganizing responsibilities and positions to better align financial incentives and decision-making power, would not contribute to program costs. The mayor's office is open to restructuring the energy management function to increase energy efficiency if it will significantly contribute to reaching the 20% reduction goal in a cost-effective manner.

The City

The city's current approach to energy management is typical of other U.S. cities in which energy management at the building level is the responsibility of operations and maintenance staff assigned to a building or a small portfolio of buildings. The staff's primary focus is operation and maintenance of buildings for safety while keeping costs low. Managers are typically trying to keep existing equipment working as long as possible, and are sometimes forced to if other capital replacements take precedent. The facility manager and/or building engineer at each property may choose which if any energy efficiency improvements to pursue using their limited discretionary funds. Interest in and knowledge of energy efficiency varies by staff member, and many do not see themselves as having a large role in improving energy efficiency, particularly because any ongoing energy savings are returned to the city general fund and are not prioritized by the agencies occupying the buildings. Building operation and maintenance staff meet with their management to discuss safety and system maintenance issues, and for performance reviews.

The city energy management office comprises of 6 full time employees with interdisciplinary backgrounds. The city's 150 public buildings are managed by 10 facility management staff who report to the agencies housed in the buildings they manage and the Facilities Management Director. The energy management office is allocated 2% of the city's budget, which covers employee salaries and administrative costs. Your team has the opportunity to capture an additional 2% of the city budget from the special projects fund through your proposal. It is important for your strategy to be cost effective and sustainable in the long term, so you must carefully consider the various costs of acquiring and managing energy use data, making operational and capital improvements, and incentivizing facility managers. Keeping in mind that roughly 50% of the city's energy consumption is street lighting, examine the savings which can be achieved through your program.

The Capital Improvement Budget

The city's capital improvement budget is regulated by the facilities improvement team, with oversight from the City Council, which prioritizes and approves applications from agencies and offices at the beginning of each fiscal year. Offices and agencies are not currently required to consult the energy management office before submitting an application to the facilities improvement team.

Criteria for capital project approval:

- Proposals for upgrades to facilities that serve an important public purpose, have large square footage, and greatest occupancy are usually given preference. Projects are also approved based on expected performance improvement, occupant benefits, improvements in summer or winter comfort, reduction in maintenance hours, and improved worker safety.
- Proposed projects should typically show a payback of less than 10 years, have evidence to support forecasted benefits, and demonstrated post-construction support (i.e. availability of warranty/service contract, training for maintenance staff, and a plan for outreach to building occupants).²
- Proposed improvements that drive new economic development from the private sector, leverage private dollars and/or grant funding, feature an educational opportunity that benefits the public, or meet additional needs beyond energy efficiency are also viewed favorably.

Utility and Energy Data

The large investor-owned utility serving the city is open to discussing ways to increase energy efficiency, and currently offers online access to downloadable utility bill information by service account. The utility tracks energy use information by service accounts only, which are identified by street address rather than building name. The city has several agencies, several kinds of buildings, and multiple agencies/departments sharing buildings, none of which receive their utility bill directly. Utility bills are received and paid for by a central city financial office and are not reviewed systematically by individual departments or buildings. Several accounts may serve one building, or one account may serve several buildings, so the utility is unable to offer whole building energy use data³ for all of your buildings at this time.

There is no central energy data collection and management system. The city's buildings have a wide range of ages, uses, meter configurations, and levels of automation. A listing of city-owned and operated buildings and addresses has been compiled from City insurance records, but is not matched with meter information, and the inventory does not describe the buildings' assets or attributes. Creating a full building inventory that details all major types of energy consuming systems can be very time intensive and costly.⁴

² There are challenges for cities to include return on investment (ROI) requirements in their capital budgeting process, as they must compare the benefits from diverse actions such as achieving energy savings or building new roads. Assets are too diverse to create a strict rule.

³ Most buildings have both gas and electric usage.

⁴ Accurate data collection and program compliance are major concerns for many cities.

Purchasing and Procurement Issues

There are a number of issues in the current procurement process which make incentivizing and implementing energy efficiency improvements challenging. Spending limits per fiscal year can necessitate breaking a single project into two or more phases over multiple years. Other limits may restrict sole-sourcing and require a bidding process. Potential contractors typically need to pre-qualify prior to bidding on proposed work. Additionally, there is a significant time commitment on the part of the city to develop requests for proposals (RFPs) and solicit bids. Labor compliance must also be considered.

The energy management office has considered energy savings performance contracts (ESPCs) as a means to implement energy efficiency projects in city buildings, but the model doesn't fit well with the current procurement processes of the city. For the city the lowest bid wins the job. In an ESPC arrangement, the energy service company (ESCO) must first complete a technical audit to determine the recommended energy conservation measures (ECMs). The key factor in an ESCO's bid is not necessarily the upfront price point but the quality of the work done, which can help ensure the promised energy savings. Also, due to the relatively small size of projects proposed by small towns or individual agencies, ESCOs are not interested because the time and effort needed to complete the lengthy performance contracting process.

The financial office has not been comfortable with ESPCs and the possibility of the city defaulting on their obligations in the arrangement. Likewise, the city legal office is concerned with indemnification and what would happen if an ESCO went bankrupt during a project. They are also wary of the measurement and verification process for completed projects. Under the current system, ESCOs would need to go through a lengthy qualifications process based on capacity, solvency, quality and financial stability for each individual project. The entire ESPC process, from developing an RFP to negotiating a contract and confirming post-project performance, is daunting for the city.

General Resources

- The Civic Federation: Capital Planning in Major Cities - <http://www.civiced.org/civic-federation/blog/capital-planning-major-cities>
- National Advisory Council on State and Local Budgeting Practice : A Framework for Improved State and Local Budgeting and Recommending Budgeting Practices - http://www.co.larimer.co.us/budget/budget_practices.pdf
- The Energy Network: Guidebooks on Energy Efficiency in Public Agencies <http://publicagencies.theenergynetwork.com/services/project-management-plans>
- Energy Efficiency in Local Government Operations - http://www.epa.gov/statelocalclimate/documents/pdf/ee_municipal_operations.pdf
- Energy efficiency and procurement - <http://epa.gov/statelocalclimate/documents/pdf/energyefficientpurchasing.pdf>
- Energy management - <http://www.energystar.gov/buildings/about-us/how-can-we-help-you/build-energy-program/guidelines>
- WIP State and Local Solutions Center: Energy Data Management and Evaluation - http://www1.eere.energy.gov/wip/solutioncenter/data_management.html
- ENERGY STAR Portfolio Manager resources - <http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager>
- Pittsburgh City Budget: <http://pittsburghpa.gov/information/budget>
- Chicago City Budget: http://www.cityofchicago.org/city/en/depts/obm/provdrs/city_budg.html
- The City of Asheville Sustainability Management Plan: <http://www.ashevillenc.gov/Portals/0/city-documents/Sustainability/AVLSustMGMTPlan.pdf>
- City of Burlington Organizational Structure: <http://cms.burlington.ca/AssetFactory.aspx?did=16636>
- City of Whitehorse – Energy Management Plan Final Report: <http://www.city.whitehorse.yk.ca/modules/showdocument.aspx?documentid=2939>
- Southeast Michigan Regional Energy Office: <http://regionalenergyoffice.org/municipal/energy-management-planning/>
- The City of Virginia Beach: <http://www.vbgov.com/government/offices/green/energy/pages/energy-resources.aspx>
- The Cambridge Department of Public Works: <https://www.cambridgema.gov/theworks/greenliving/WhatWeAreDoing/energymanagement.aspx>
- Better Buildings Challenge State and Municipal Partners: <http://www4.eere.energy.gov/challenge/partners>