

COMMERCIAL PARTNER

UNIVERSITY OF PITTSBURGH MEDICAL CENTER



Implementation Model: Centralized Energy Management and Capital Set-Aside Fund

ORGANIZATION TYPE
Hospital/Healthcare Facility

BARRIER

Difficulty prioritizing energy efficiency improvements over clinical expenditures in a combined capital budget

SOLUTION

Creation of a UPMC Energy and Environmental Engineering Department with a targeted skillset and a dedicated annual budget for energy efficiency improvements

OUTCOME

Portfolio-wide energy use, energy cost, and greenhouse gas reductions



Overview

UPMC's healthcare system portfolio contains 20 hospitals and over 400 outpatient centers, totaling over 13 million square feet of conditioned space. The combination of exponential energy cost increases in the early 2000's and the recognized impact of power plant emissions on public health, as underscored by Harvard University researcher J. Levy contributed to UPMC's decision to make dramatic improvements to its management of energy¹. In addition to conservation investment, UPMC developed energy price risk management strategies, participates in demand-response load shedding, and proactively monitors legislative and regulatory proceedings in support of economic and conservation goals.

Though links between energy conservation and financial and community health benefits were a great motivator, securing the investments necessary to meet conservation targets proved to be a challenge. As with many healthcare facilities in the United States, energy efficiency improvements at UPMC were very difficult to implement at a meaningful scale because of their high upfront costs, and because they are often "trumped" by clinical investments such as medical equipment. In addition, individual facilities lacked staff resources to orchestrate energy-saving projects themselves.

In order to meet its energy conservation goals, UPMC established the Corporate Energy and Environmental Engineering (CEEE) Department in 2011. The new department was responsible for energy strategy across the organization and was granted a \$5 million annual capital budget for energy efficiency projects. Thus armed, the goal of improving the day-to-day health of the community and the organization's bottom-line through energy solutions is achievable. UPMC's executive management determined the environmentally cleanest and lowest cost unit of energy to be "the one not used".

UPMC's Playbook



Policies

- UPMC is committed to reducing energy use by 20% by 2020 from a 2011 baseline.
- Energy efficiency projects funded by the UPMC capital set-aside must show five year simple payback.



Process

Centralizing Energy Management at UPMC

¹ Levy JI, Spengler JD, Hlinka D, Sullivan D, Moon D: Using CALPUFF to evaluate the impacts of power plant emissions in Illinois: model sensitivity and implications. Atmos Environ 2002, 36:1063-1075

UPMC needed to approach energy management holistically in order to achieve significant reductions across the building portfolio. The hospital system centralized the energy management the creation of the Corporate Energy and Environmental Engineering (CEEE) Department. Department members possess key skills including:

- Deep knowledge of the engineering and regulatory aspects of hospital operation
- Understanding of energy commodities markets
- Financial acumen to produce functional energy budgets
- Expertise to evaluate emerging technologies
- Familiarity with third-party funding opportunities for energy efficiency projects (such as grants, utility incentives and rebates)

Initiating the Capital Set-Aside

The 2012 federally mandated phase-out of T12 lamps spurred initial funding for lighting retrofits on the UPMC campus. UPMC armed the CEEE Department with dedicated internal capital (up to \$5 million/year) for energy efficiency, which eliminated competition for funding with clinical expenditures, and created a “welcome mat” at each facility as facility managers and building engineers sought funding for their long-shelved energy projects. In addition to lighting upgrades, the capital set-aside funds projects including building retro-commissioning and insulating covers for steam pipes, valves and fittings. UPMC is also piloting low temperature geothermal to heat and cool a wing of one of their rural hospitals.

Proposed projects must meet corporate ROI hurdles and have a five-year simple payback in order to be considered for funding. With numerous UPMC facilities now lining up to implement energy efficiency projects in their buildings, the CEEE Department has the luxury of piloting a project in a single facility to test its efficacy and cost effectiveness before rolling it out more broadly to other buildings.

Success breeds success: a history of energy-saving projects attracted grants and other external funding for additional projects. UPMC has benefitted from over \$ 3.4 million dollars of external energy efficiency project funding since 2010, including funds from Pennsylvania Energy Development Authority; electric utility funding via Pennsylvania’s 2010 Electricity Demand Reduction Law (Act 129); and revenue from participation in the Federal Energy Regulatory Commission’s (FERC)-endorsed Demand Response program. The low temperature geothermal pilot project was endorsed and partially funded by the Pennsylvania Department of Environmental Protection.

Stabilizing Energy Costs Supports Energy Efficiency Projects

Though not a direct energy use reduction strategy, the CEEE Department also takes advantage of open market commodity energy purchases, which produce reliable pricing forecasts, allow senior management to employ layering and financial hedging strategies, and ultimately minimizes the effects of historically volatile price swings on electricity and natural gas. The added security of more stable utility costs provides confidence Return on Investment projections for energy efficiency projects will be accurate.

Outreach

Opportunities for energy conservation improvements are communicated to building engineers at each UPMC facility during the monthly meetings of the Facilities Engineering Council, an organization formed



and led by UPMC's VP of Facilities and Support Services. Facility staff at individual buildings are encouraged submit project ideas to the CEEE Department.



Tools and Resources

- [Lighting Project ROI Calculator](#) – Developed by UPMC to quickly determine the return on investment and payback period for lighting retrofit projects.
- [U.S. DOE Steam Tip Sheet #17](#) – UPMC used this guidance from the U.S. Department of Energy to inform their projections of energy and cost savings resulting from installation of insulated covers on pipes, valves and fittings.
- [Database of State Incentives for Renewables and Efficiency \(DSIRE\)](#) – Searchable database of energy efficiency and renewable energy policies and funding opportunities by state.



Measuring Success

UPMC measures success based upon an accounting of energy units (and thus carbon emissions) forever eliminated from their operations. To do this, UPMC adopted a zero-base budget approach using 2010 as the baseline year. From this base, carbon emissions forever eliminated through engineered conservation would be summed and aggregated ---2010 as the base year equals zero, 2011 equals base year + N1, 2012 equals base year + N1 + N2, and so on.



Outcomes

When the first full year had elapsed, the CEEE Department returned approximately \$1 million to the Fiscal Year 2012 bottom-line, and engineered through energy conservation the prevention of 11 million tons of carbon dioxide from entering the community's air.

By July 2011, after just eight months of formal existence, 7 million kilowatt hours of power plant electric generation, and 14 million cubic feet of natural gas formerly required by UPMC healthcare facilities annually, were forever eliminated.

By June 2012, the \$5 million dedicated annually to engineered energy and environmental conservation projects eliminated another four million kilowatt hours, and the combustion of another 2.7 million cubic feet of natural gas.