Quarterly Energy Report

Q2 - July 2023

Energy Overview

Since 2021, new energy management strategies have been implemented to help track and reduce energy use within Louisville Metro Government (LMG). These efforts include setback scheduling, utility billing analysis, and building optimization efforts, and LMG has realized approximately $2,008,000 of utility cost avoidance since the start of the program, with $474,000 of cost avoidance realized to date in calendar year 2023. Established in FY23, the Energy Innovation Fund was provided $700,000 in the budget for FY23, which is being used to finance energy efficiency upgrades, such as lighting, HVAC improvements, and building controls. While substantial work has been dedicated to building a thorough and reliable database, improving benchmarking and data management practices will continue to be an ongoing effort. This report uses graphics generated through the benchmarking platform to help provide high level understanding of LMG's energy profile, however, keep in mind that the accuracy of the charts may still be affected by gaps in historical data.

Usage by Department - July 2022 to June 2023

Figure 1: Breakdown of recorded energy usage by department. Departments managing numerous facilities have the highest associated energy usage, and street lighting is the largest consumer of power not associated with buildings.

Utility Cost Avoidance by Building - July 2022 to June 2023

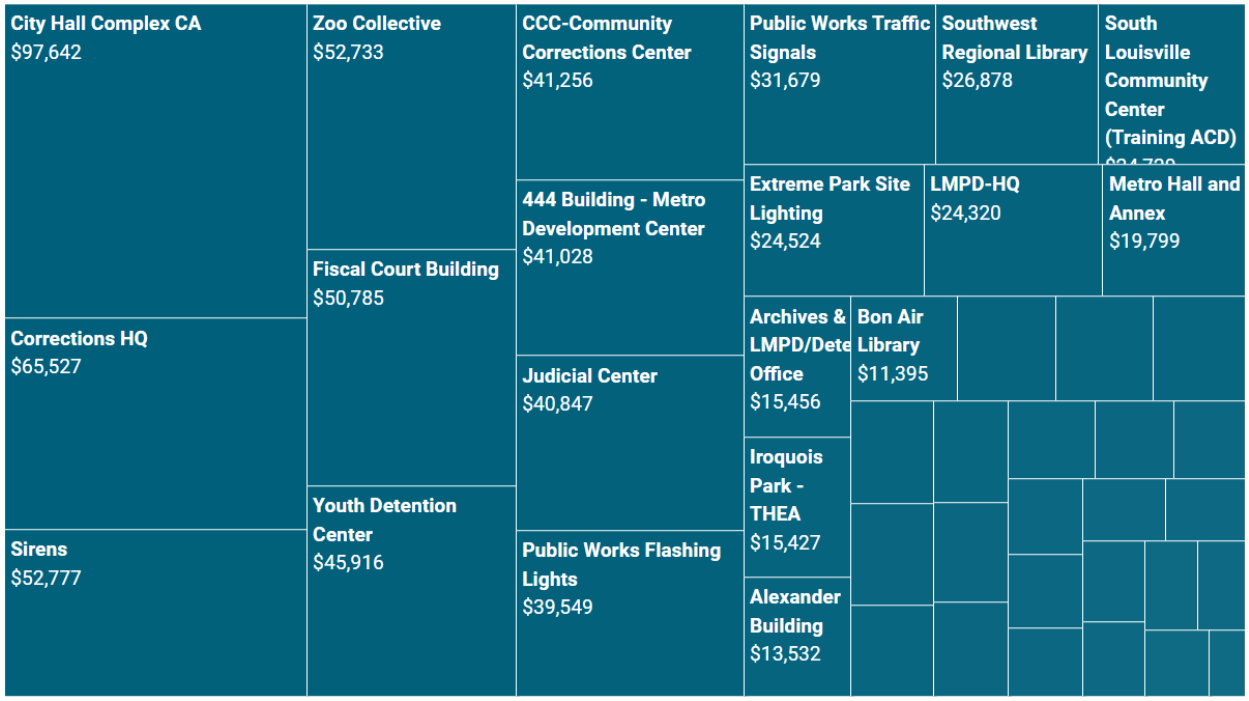


Figure 2: Breakdown of utility cost avoidance per building. The amount of savings is influenced by the starting conditions, operational and equipment changes, controls capabilities, and how much runtime can be reduced.

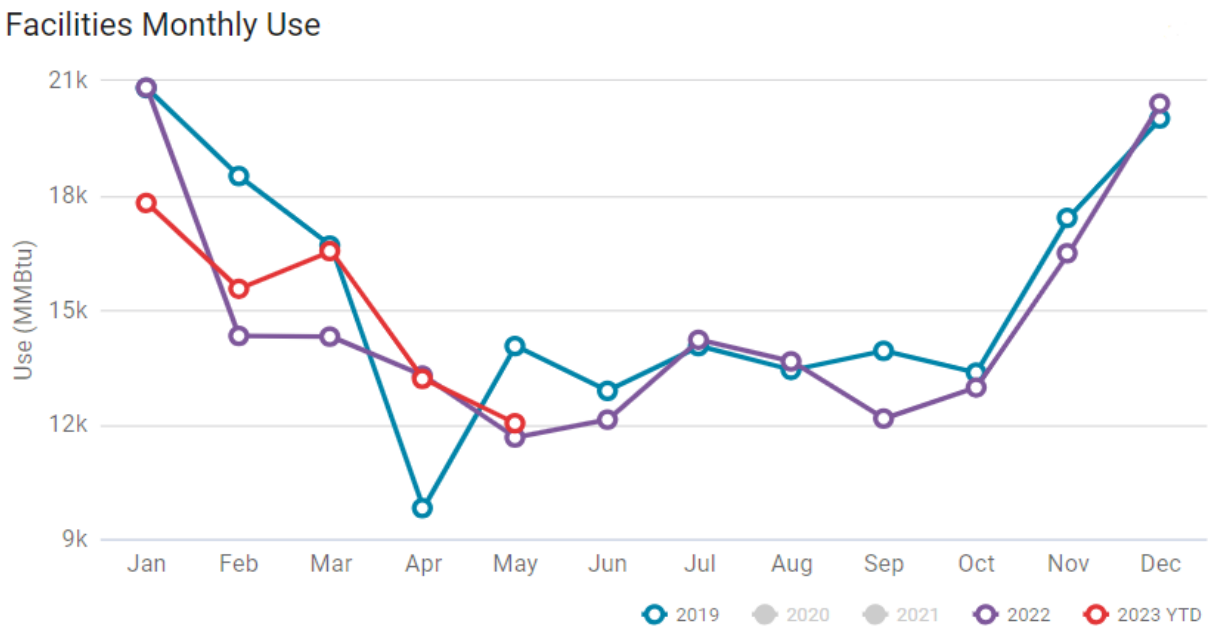
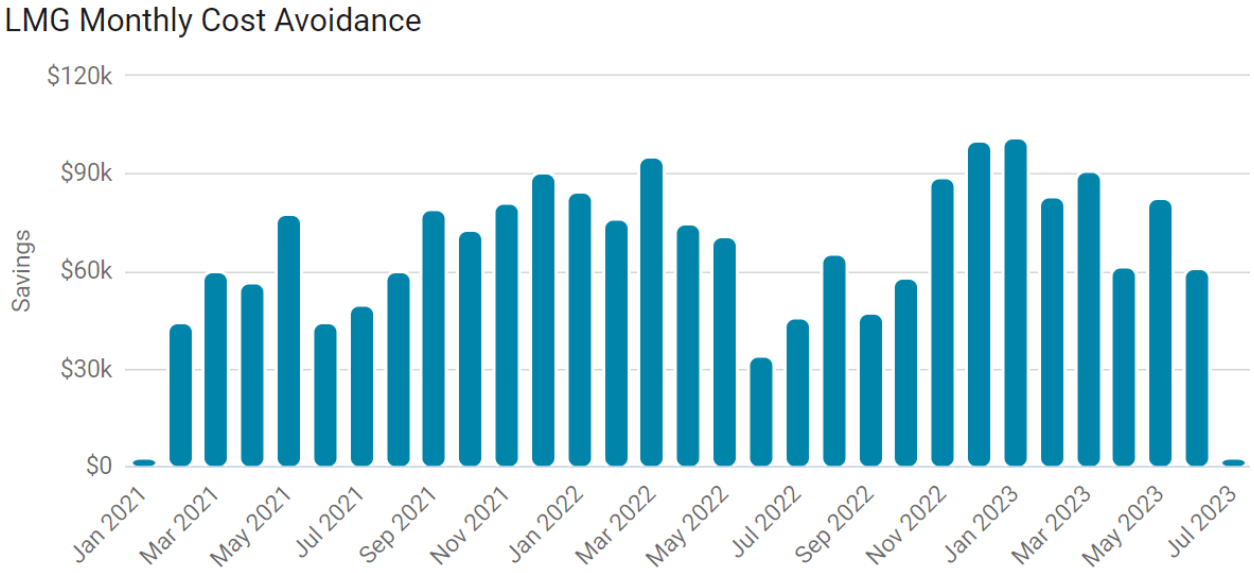


Figure 3: Total year-over-year energy use of buildings managed by the Office Facilities and Fleet Management. Calendar year 2023 features notably lower consumption than the 2019 baseline.



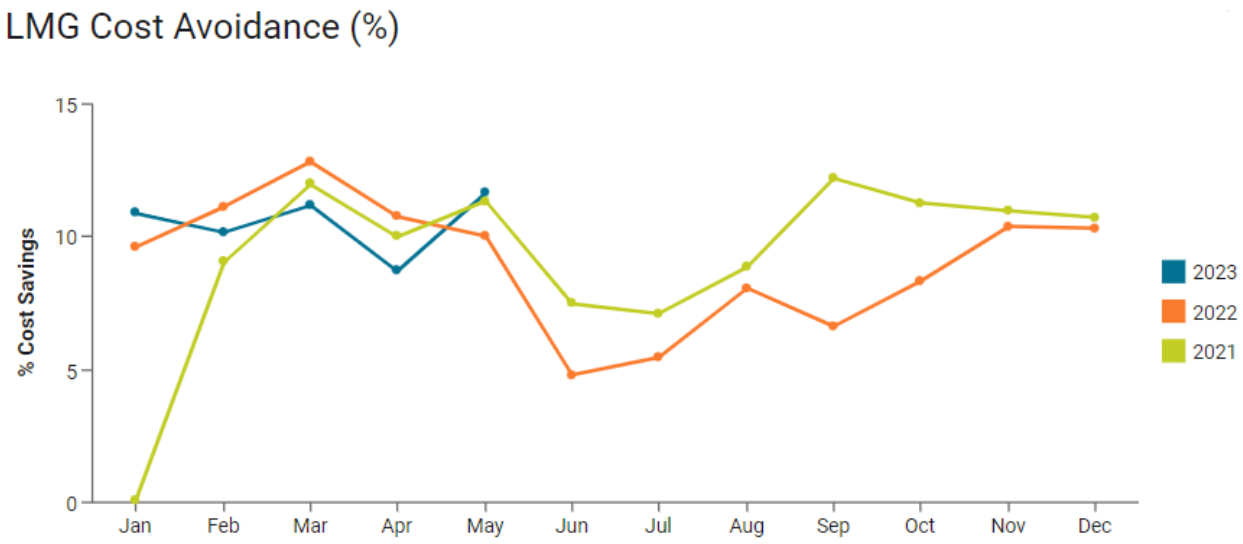


Figure 4: Total monthly cost avoidance and percentage savings for LMG utility accounts. Significant savings can be observed from operational improvements from the 2019 baseline.

Data

All of LMG's utility spend is now being processed through digital billing, with data automatically being captured and benchmarked in our EnergyCAP database for most LMG facilities. Before 2021, less than 50% of this data was being captured, and very few buildings were being benchmarked. Now, any changes in building energy performance can be accurately monitored over time, which will also help target areas of high opportunity or new energy losses. This data is being used to generate dashboards and provide high-level breakdowns of LMG energy usage. A public-facing energy dashboard has been maintained so that LMG data is more transparent and accessible to residents and to help provide context to the city's energy goals. (See https://www.100percentlou.com/energy-dashboard) Additionally, there have been extensive efforts in conjunction with Civic Innovation and Technology to import historical 2019 data into EnergyCAP to serve as a baseline year, a reference year to evaluate utility cost avoidance.

Billing

Large organizations need to routinely assess and optimize their utility accounts to ensure they are all classified under ideal rates and without unnecessary fees. With over 1300 utility accounts across a multitude of agencies, LMG's utility accounts utilize dozens of rates and billing structures. As end-use in buildings change, along with the pricing of LG&E's rates, opportunities arise for LMG to move accounts to more cost-effective options. In calendar year 2021, 260 LMG accounts were identified as having more cost-effective billing alternatives, and requests to update billing have been submitted to LG&E for each. Additionally, 9 utility accounts were identified for closure as service was no longer needed in these locations due to vacated facilities or removed equipment, thus eliminating unnecessary base charges. Together, these billing changes and account closures are anticipated to produce approximately $165,000

in utility savings annually moving forward. It is also important to note that in 2021, the Public Service Commission approved LG&E's request for a rate increase. Many LMG accounts are experiencing up to 9% higher power costs since July 2021, which calls for continued rate analysis to identify the most cost-effective options.

Building Optimization

A core approach of energy management is improving the operations of building HVAC and mechanical systems so that they can maintain comfortable conditions while consuming far less energy. Night and weekend setbacks on HVAC operation can be logistically challenging to coordinate but have no implementation cost and substantially lower utility consumption. Since 2021, new setback scheduling was implemented in approximately 1,000,000 square feet of metro facilities. On average, this has produced a reduction in HVAC runtime of nearly 50% in these facilities. The Energy Manager has been involved in evaluating operation of central heating and cooling systems in areas with historical performance issues to help target adjustments that will result in more comfortable and efficient buildings. This is an ongoing effort that will be including more buildings and tailored optimization strategies as appropriate. In buildings that have been targeted with larger systemic changes, utility cost avoidance of up to 50% have been seen in comparison to historical utility data. In 2022, the Louisville Energy Alliance (LEA) presented LMG with Kilowatt Crackdown awards for two properties, the Northeast Regional Library and the Metro Development Center, to recognize their substantial reductions in energy use in 2021. These buildings reduced their energy use by 20% and 45% respectively, reducing emissions by over 250 tons of CO_2, which is equivalent to the energy use of 30 homes in a year. The Kilowatt Crackdown Challenge is a city-wide competition organized by the LEA to incentivize energy efficiency and honor buildings that have demonstrated the largest improvements in performance.

Energy Innovation Fund

As an organization with large building inventories, it is also important to invest in building improvements that will produce substantial utility returns, especially as utility rates increase. Projects that produce large utility savings can include LED lighting retrofits, building controls systems, recommissioning of aged equipment, and in some cases replacement of inefficient mechanical systems. In 2022, Louisville Metro Council formalized the creation of the "Energy Innovation Fund" to facilitate investment in projects that produce utility cost savings. The structure of this fund was drafted in coordination with OMB to establish a long-term process to internally finance energy projects using the utility savings that are produced. Re-investing energy savings into LMG energy infrastructure through a dedicated energy fund will create momentum towards internal energy goals, while generating increasing returns over time. In 2023, the Department of Energy awarded LMG with a Better Practice Award, which recognizes Better Buildings Challenge partners for innovative and industry-leading accomplishments in

implementing and promoting practices, principles, and procedures of energy management. LMG was selected for its implementation of the Energy Innovation Fund as a mechanism to self-finance energy improvements within our facilities.

LMG is currently working with the Department of Energy's National Renewable Energy Laboratory (NREL) to develop plans for meeting LMG's clean energy goals. Phase II of NREL's work is facilitating efforts to secure a cleaner energy supply while also supporting energy efficiency and conservation work. NREL will help strategically identify and prioritize short term and long-term capital projects that will have the greatest impact in meeting energy goals while also reducing utility costs. Initial projects will prioritize upgrades to LED lighting, installing further building controls, HVAC improvements, and potentially recommissioning services to help inform future projects. Starting in July of 2023, the Phase II work with NREL has partnered with a local recommissioning, engineering, and sustainability consulting firm in order to conduct ASHRAE Level 1 audits of our largest and most-energy intensive buildings. While conducting these audits, Paladin is collecting detailed building data that NREL will use to generate advanced energy models of LMG's building portfolio. NREL will use the models to simulate and assess the projects that will generate the largest improvements in building performance, which will inform long term capital project priorities.

Currently, 12 buildings have been selected for full-building upgrades to LED lighting, and 8 lighting projects have already been funded or encumbered. In total these first twelve conversions will represent nearly 200,000 square feet of LMG spaces converted to LED lighting. These areas were selected for a variety of factors, including size, a high potential for energy savings due to long runtimes and high energy intensity of existing systems. The EIF also funded major improvements to the ventilation and economizer systems at the Hall of Justice and Judicial Center buildings, which will allow for greatly improved efficiency while improving building ventilation control. Finally, a controls project will be launched soon to add portions of Metro Hall to LMG's building automation system. This will improve comfort within the building while allowing night and weekend setbacks, which would produce substantial cost savings. Updates on the development of these and other upcoming projects will be provided in future reports.

The eight LED lighting projects that have been funded fully or in-part by the EIF include LED conversions at the Central Government Center, LMPD K9, LMPD 5th Division, Electrical Maintenance, Chickasaw Park, Zoo HerpAquarium, Fire Engine 1, and Fire Engine 12 properties. Six of these are now complete:

Figure 5: Images from before, during, and after LED lighting conversions performed by Facilities' Electricians at the Central Government Center and Electrical Maintenance buildings.

The FY24 budget passed by Louisville Metro Council included funding for a new Energy Specialist position. The hiring process for this position will begin in the coming months. Once on board, the Energy Specialist will accelerate progress towards LMG's energy goals and help maximize the utility cost savings LMG is able to achieve. It is anticipated that this position will also accelerate the process of identifying and implementing capital projects in LMG facilities.