Updated and Upgraded

Improving energy efficiency in Athens-Clarke County

Report by
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ROOSEVELT INSTITUTE
REIMAGINE THE RULES

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About the Author

Shreya studies economics and statistics and has cultivated an interest in energy policy, clean energy innovation and deployment, and data analytics. Her extracurricular experiences – including working on implementing the Paris Agreement at the U.S. Department of State and researching policy instruments to reduce carbon emissions through building energy efficiency with the Roosevelt Institute – have revealed that sustainable funding pipelines are crucial to commercializing clean energy infrastructure. Her research on environmental quality metrics in Seattle has also demonstrated that data, alone, will not generate environmental progress. In her career, Shreya hopes to use quantitative and policy tools to engage competing stakeholders in joint clean energy initiatives. Shreya also enjoys running and trying new local farmers markets.

Executive Summary

Since 2007, the Athens-Clarke County (ACC) Mayor and Commission have expressed an interest in improving energy efficiency in public infrastructure. Yet only a handful of small-scale initiatives have been implemented. Old, inefficient buildings continue to waste energy, causing ACC to increase its carbon footprint and utilities expenditures. This trend in rising environmental output and economic costs is unsustainable and demands attention.

This proposal recommends that Athens-Clarke County Unified Government (ACCUG) retrofit inefficient public buildings identified using existing data on energy use and costs. In order to finance these upgrades, the ACC Commission should employ capital improvement funds raised through a preexisting special-purpose local-option sales tax (SPLOST). The Commission and Finance Department should also reorganize the county's annual operating budget such that all utility costs are housed in one Utility Internal Service Fund (ISF) rather than disbursed as line items in certain departments' budgets. The cost savings accrued through building upgrades would then replenish the Utility ISF, and ACCUG would gradually reduce the amount it spends on utilities. This proposal would allow ACCUG to better utilize taxpayer dollars while acting on long-overdue energy efficiency improvements and fostering a healthier community.

I: INTRODUCTION

This section examines how energy is utilized in buildings and how energy efficiency provides a tool to reduce consumption, carbon footprints, and costs.

TRENDS IN ENERGY EFFICIENCY POLICY

Buildings account for approximately 33 percent of global energy demand and 35 percent of energy-related carbon dioxide (CO2) emissions (Brown 2015). In the U.S., buildings produce over 39 percent of the domestic carbon dioxide emissions (USGBC 2009). There are nearly 6 million commercial and industrial facilities in the U.S. with combined annual energy costs equivalent to approximately $400 billion. Of these buildings, 30 percent waste energy. If both industrial and commercial buildings improved their efficiency by 10 percent, they would avoid $40 billion in energy costs and prevent GHG emissions equivalent to that of 49 million motor vehicles (Energy Star 2015).

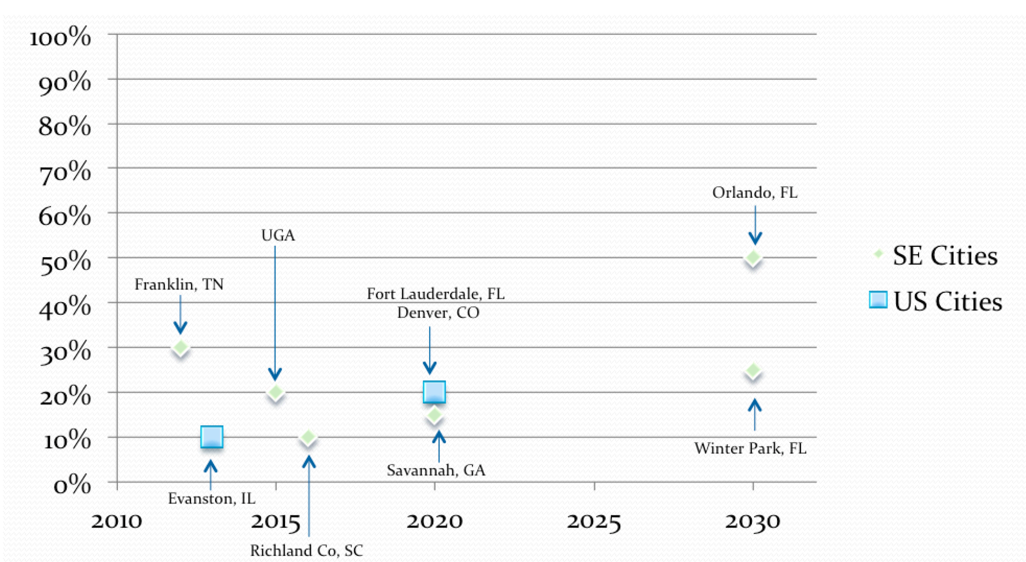
At the municipal level, urban policy research traditionally focuses on large cities such as Austin, TX, Seattle, WA, or Atlanta, GA. Programs with long-term goals often aim for 10–50 percent reductions in energy use intensity (EUI) by 2030. Short-run strategies to meet these goals include: hiring an energy manager; monitoring building energy data using online tools; creating education programs; enforcing building standards (ASHRAE 90.1, Energy Star, or LEED); and leveraging finance through sustainable funding pipelines (Saunders 2016).

In most states, however, environmental agencies, nonprofits, and local governments fail to prioritize energy efficiency in smaller jurisdictions. Many small-to-midsize cities (e.g., Athens, GA) waste building energy, resulting in high energy costs and GHG emissions (USGBC 2014). Improving the energy efficiency of buildings provides the lowest-cost approach to mitigating greenhouse gas (GHG) emissions (Brown 2015).

The city of Atlanta, located just 90 minutes outside of Athens, is currently ranked 15th in the country for energy efficiency, immediately preceded by Philadelphia, PN and Houston, TX (ACEEE 2015). In 2015, Atlanta required all public and private buildings over a certain square footage to organize energy use and utility data in an open-source database called Portfolio Manager. Analyzing this information laid the groundwork for one of the most successful energy-saving initiatives in the southeast. Also, Atlanta's Office of Sustainability, along with several public and private partners, piloted the U.S. Department of Energy's Better Buildings Challenge (BBC) in 2011. The program aimed to reduce commercial energy and water consumption by 20 percent by 2020 in over 100 million square feet of building space. Atlanta was one of the first of 51 partners (34 cities, 10 counties, and 7 states) to join the challenge (Better Buildings 2016). It initially sought to reduce over 302kWh of electricity and 107.5 gallons of water. The 2013 Atlanta BBC Annual Report found that 18 buildings (out of 129 participants), from the Georgia Dome to the Atlanta Civic Center, had surpassed their 2020 targets. By 2015 (5 years before its 2020 target), Atlanta had already exceeded its water savings goal by 2 percent and was just 4 percent away from its EUI goal. The Atlanta BBC is the most successful program in the country, other than Washington, D.C. (Atlanta BBC 2016).

Small-to-midsized cities, home to over 28 percent of the U.S. population, lead local approaches to energy efficiency. Figure 1 displays the municipal energy use reduction goals of small- to mid-sized cities with compositions similar to that of Athens, GA, such as Evanston, IL, home to approximately 75,400 residents and Northwestern University. While small municipalities are less likely to prioritize energy saving initiatives, they can be more nimble when reducing EUI relative to larger counterparts (Pitt and Bassett 2013). Though most community-wide economic and environmental benefits primarily come from private real estate upgrades, most local initiatives begin with upgrades on public facilities.

Figure 1: Municipal energy reduction trends (Saunders 2016)



KEY TERMS AND CONCEPTS

The following terms and concepts provide a technical and contextual framework to evaluate this policy proposal.

Figure 2: Technical terms

Term	Description
Audits	Identify building energy usage patterns and opportunities to improve efficiency; begin with site assessments of infrastructural conditions and utility data relative to similar buildings; performed by energy services companies; follow stipulations of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) (PNNL 2011)
Capital fund	Independent fiscal/accounting entity with money allocated to fulfill certain objectives (ACCUG 2016f)
Carbon dioxide (CO2)	Primary greenhouse gas (GHG) emission from human activities; comprises 64.3 percent of 2014 global anthropogenic emissions; comprises 81 percent of U.S. 2014 anthropogenic emissions (EPA 2016)
Carbon footprint	Overall environmental output (GHG emissions) of human activities; expressed in metric tons carbon dioxide equivalents (metric tons CO2e)
Consumer Price Index (CPI)	Measure of economic growth based on relative prices of goods (ACCUG 2016f)
Cost savings	Money saved throughout lifetime of EEMs after payback period (e.g., two years for large-scale LED lighting upgrades)
Energy	Electricity/natural gas utilized by buildings to operate appliances, lighting, heating and cooling, office equipment, etc.; measured in kWh (kilowatt-hours) and kBTU (kilo British thermal units (BTU) (Brown 2015)
Energy cost	Annual cost of energy used by a building (Leach et al. 2010)
Energy emissions	Emissions from building energy use (Leach et al. 2010)
Energy efficiency	Utilizing less electricity input to achieve the same service or output (e.g., switching from fluorescent to LED lighting systems reduces amount of electricity consumed while delivering brighter light) (Brown 2015)
Energy efficiency measures (EEMs)	Building energy upgrades recommended by energy audits to reduce utilities consumption, costs, and GHG emissions (e.g., lighting retrofits, building envelope insulation, heating/air conditioning system upgrades) (PNNL 2011)
Energy savings	Avoided electricity/natural gas input to maintain or improve

	energy performance through EEMs
Greenhouse gas (GHG) emissions	Chemicals (i.e., carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O)) released into atmosphere from building energy use; represented in metric tons carbon dioxide equivalents (tons CO2e) or in kgCO2e/ ft2 (Portfolio Manager 2016a)
Portfolio Manager	U.S. Environmental Protection Agency (EPA)'s free, online building energy data collection program; analyzes utility data (from power company), building structural characteristics and energy use (data entered by ACCUG officials) to generate reports on consumption patterns and opportunities to correct unsustainable trends (Klass and Wilson 2014)
Site energy use intensity (EUI)	Overall building energy consumption divided by total floor area (kBTU/ft2) (Leach et al. 2010, Portfolio Manager 2016a)
Weather-normalized energy	Energy cost and EUI controlled for weather variability (Portfolio Manager 2016a, Portfolio Manager 2016c)

Figure 2: Context terms

Term	Description
Annual operating budget (AOB)	Current revenues and expenditures; published every fiscal year in July (FY17 currently in progress) (ACCUG 2016f)
Athens-Clarke County Unified Government (ACCUG)	Consolidated city-county government of Athens-Clarke County (ACC) in Athens, GA; led by Mayor, Manager, and Commission; consists of 91 county buildings (out of 195 facilities) and 35 departments
Energy audits	ASHRAE Level II assessments: review electric utility bills and inspect physical buildings to offer tailored analyses of energy usage and costs for individual buildings (PNNL 2011)
Electricity consumer	35 ACCUG departments (e.g., Central Services, Finance, Leisure Services, Housing & Community Development)
Utility Internal Service Fund (ISF)	Proposed as a capital account housing ACCUG utilities allocations; unused funds rollover every fiscal year (FY)
Special-Purpose Local-Options Sales Tax (SPLOST)	Optional $0.01 sales tax to fund community improvement/capital projects; voted on every five years; current revenue collection ends July 2018 (ACCUG 2016)
Utilities	Electricity and natural gas provided to ACCUG departments by Georgia Power and regional EMCs
Utility provider	Georgia Power, Inc. and local electric membership corporations (EMCs)

II: BACKGROUND AND CONTEXT

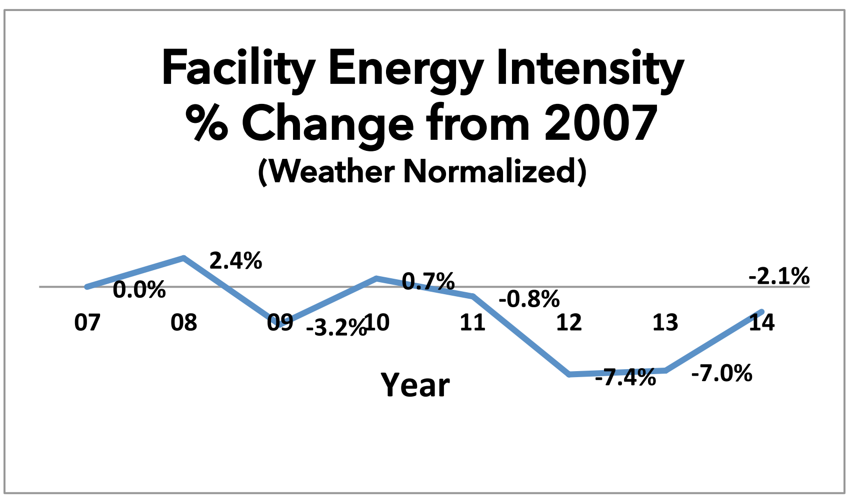
This section outlines energy use in Athens-Clarke County, GA, and goals to improve energy efficiency in public buildings.

Home to 120,938 residents and the University of Georgia, Athens-Clarke County is a consolidated city-county, administered by the Athens-Clarke County Unified Government (ACCUG). Currently, Mayor Nancy B. Denson, four County Managers, and 10 County Commissioners oversee the activities of all 35 ACCUG departments (ACCG 2016a). The county maintains 195 facilities (91 of which are buildings) or a total area of approximately 2 million square feet. A 25-person staff, responsible for executing over 6,000 work orders every year, oversees maintenance operations and manages the unprecedented growth of building space and energy demanded (Saunders 2016).

ENERGY USE

In 2014, ACCUG began organizing utility and EUI data in Portfolio Manager. This open-source database stores all utility, building, and energy consumption data. It maps consumption trends and provides recommendations to improve efficiency. For all accounting purposes, 2007 is the baseline data year. The most recent data was collected in 2014. Energy efficiency among ACCUG buildings was the highest in 2012. Energy consumption fell by 7.4 percent relative to the baseline year (34.6 kBTU/ft2 in 2007 to 32.0 kBTU/ft2), the lowest EUI decrease in all eight years of data collection. A visual representation of annual EUI can be found in Figure 4 (Portfolio Manager 2016d).

Figure 4: Percent change in energy use by existing ACCUG facilities from 2007-2014 (Saunders 2016)



SPENDING ON UTILITIES

The largest energy consumers and spenders (apart from the Public Utilities Department, which manages industrial and treatment plant facilities) are the Leisure Services, Judicial, and Sheriff Departments. In

2014, Leisure Services spent approximately $500,000 on electricity and natural gas, the Judicial Department spent around $230,000, and the Sheriff's Office spent around $240,000 (Portfolio Manager 2016b).

The annual operating budget (AOB) for FY2017 allocated $6,171,938 (3.2 percent of total AOB funds) out of $190,904,646 for utility costs. Currently, all utilities allocations are housed in the ACCUG General Fund (the primary county AOB account), where utilities are charged either directly to a department's budget (if it occupies its own building) or to the Central Services department's budget (in the case of multi-department buildings). Utility funds do not roll over after each fiscal year (ACCUG 2016f).

ENERGY EFFICIENCY POLICY

In 2007, following the example of small-to-midsized cities around the country, the ACCUG Mayor and County Commission adopted an Energy Conservation Plan "to conserve natural resources, to reduce the environmental impact of its activities, and to manage the fiscal effects of rapidly rising energy costs" (ACCUG 2007). The Plan also emphasized the need for an Environmental Coordinator and Energy Conservation Committee, which have yet to be established. Strategies to implement the sustainability goals included:

1. Determining baseline energy consumption for all ACC facilities by the end of Fiscal Year FY 2008, using FY 2006 as a target baseline
2. Establishing bi-annual energy consumption reduction goals (using FY 2006 as a baseline)
3. Prioritizing energy efficiency when undertaking maintenance projects for existing county facilities and planning future capital outlay projects

Building off the Energy Conservation Plan, the Mayor and County Commission have established a "Quality of Place" goal for 2017 (ACCUG 2016g):

1. Pursue energy conservation strategies and evaluate and implement alternative energy projects where appropriate
2. Develop, provide and maintain environmentally sensitive infrastructure systems

III: PROBLEM

This section identifies the causes of energy inefficiency in ACCUG buildings and the following effects:

1. Increased municipal carbon footprint, energy use intensity, and costs
2. Poor energy performance among several ACCUG buildings
3. Accountability gaps between those who consume and pay for utilities
4. Avoidable costs spent on utilities

RISING CARBON FOOTPRINT, ENERGY USE INTENSITY, AND COSTS

While the energy use intensities of ACCUG buildings in 2007 and 2014 seem to indicate that consumption has remained relatively constant, EUI has been on the rise since the most energy efficient year 2012. Between 2012 and 2014, EUI increased from 31.8 kBTU/ft2 to 33.7 kBTU/ft2 (a 5.3 percent increase in consumption without any major additions to building stock). Though these data points are not enough to indicate a long-term trend, ACCUG should act immediately to prevent an unsustainable trend in the future (Saunders 2016).

An increase in EUI relative to 2012 levels caused an increase in overall GHG emissions. In 2012, buildings were responsible for approximately 10,990 metric tons CO2e. In 2014, buildings were responsible for 12,130 metric tons CO2e (10.3 percent jump in emissions). Overall, the total carbon footprint of ACCUG in 2012 was 24,469 and 27,808 tons CO2e in 2014. Based on a two-year pattern of rising emissions and EUI, ACCUG's carbon footprint and utility expenses will likely continue to grow.

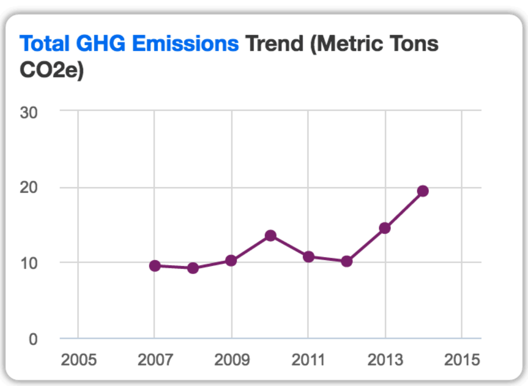
Several ACCUG buildings have experienced significant increases in GHG emissions, EUI, and energy costs. Built in 1980, the Sandy Creek Park Community Building (housed under the Leisure Services Department) experienced an 84.1 percent increase in weather-normalized EUI since 2007. The building's carbon footprint (not weather-normalized) rose by 92.1 percent. The Holland Youth Sports Complex's weather-normalized EUI increased by 77.0 percent in eight years, and non-normalized GHG emissions rose by 104.2 percent. Figure 5 presents information on some of the highest emitting buildings in ACC (Portfolio Manager 2016b).

Figure 5: Change in carbon footprint and energy use relative to baseline 2007 (not weather-normalized) (Portfolio Manager 2016b)

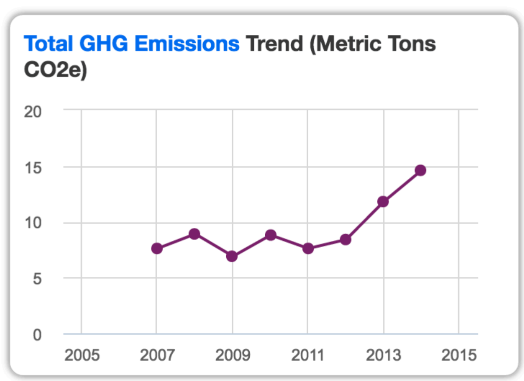
Holland Youth Sports Complex Office	
Year built	1995
Site EUI	104.9%
Total GHG emissions	104.2%
Energy costs	71.0%

Sandy Creek Community Building	
Year built	1980
Site EUI	91.3%
Total GHG emissions	92.1%
Energy costs	58.8%

Holland Youth Sports

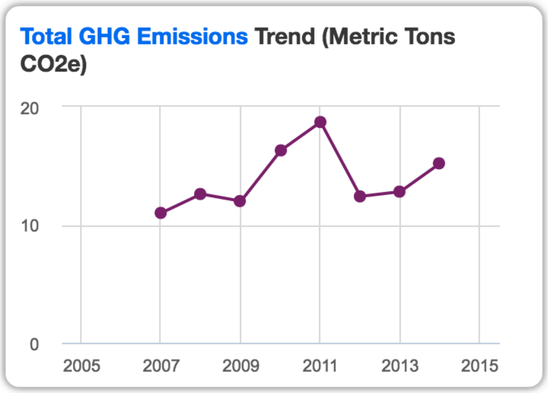


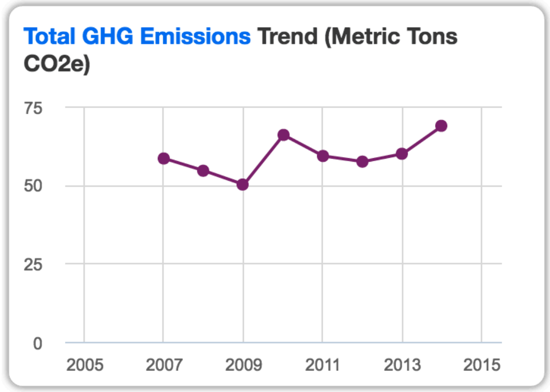
Sandy Creek Community



Sandy Creek Park Visitors Center	
Year built	1980
Site EUI	38.0%
Total GHG emissions	38.2%
Energy costs	31.0%

Taylor Grady House	
Year built	1844
Site EUI	22.5%
Total GHG emissions	17.8%
Energy costs	22.6%





POOR ENERGY PERFORMANCE AMONG ACCUG BUILDINGS

Several ACCUG buildings currently operate below the national median energy use intensity for each property type. Though the national median does not represent the target EUI for each property type, it provides a benchmark for comparing the performance of ACCUG buildings with similar functions in other cities. Figure 6 presents the relative performances of 10 of the most inefficient facilities in ACCUG building stock and their utility bill payers.

Figure 6: Energy performances of ACCUG buildings in 2014 relative to national levels (Portfolio Manager 2016b, 2016d)

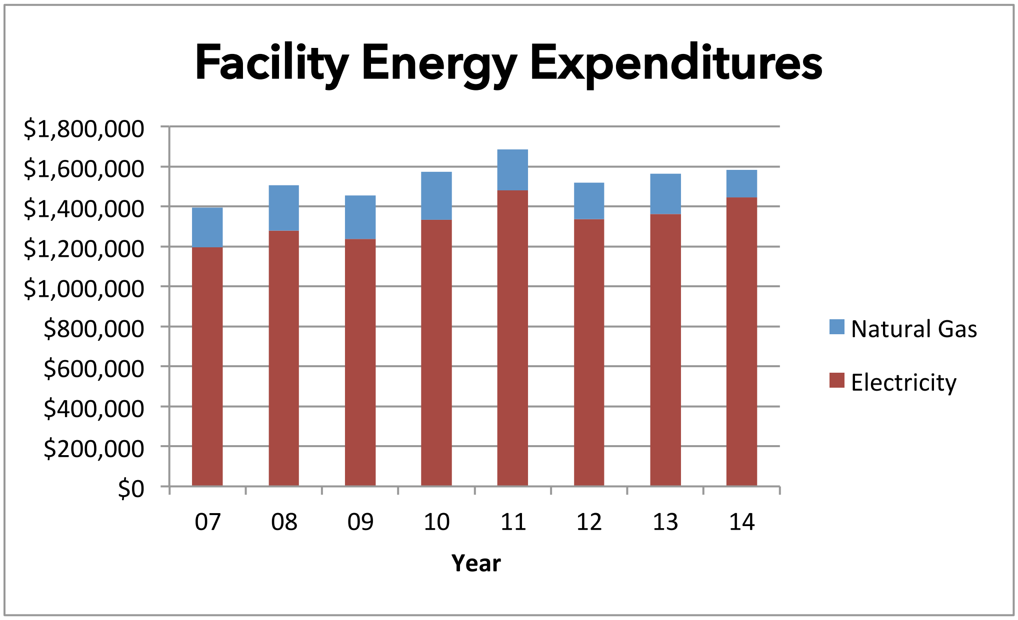
Property Name	Department	Property Type	Site EUI (kBTU/ft2)	National Median EUI (kBTU/ft2)	Department Billed
Fire Station 7	Fire	Fire Station	100.3	88.3	Fire
Community Center	Leisure Services	Recreation	60.9	41.2	Leisure Services

Satula Avenue	Finance, Housing & Community Development, and Human Resources	Office	72.5	67.3	Central Services
Welcome Center	Other	Museum	70.2	45.3	Other
Memorial Park Administrative Office	Leisure Services	Office	113.1	67.3	Leisure Services
Hancock Industrial Site Administrative Office	Central Services	Office	97.4	67.3	Solid Waste
County Jail Modular Office	Sheriff	Office	75.5	67.3	Sheriff
Transit Maintenance Shop	Transit	Repair Services	135.5	49.6	Transit
Clarke County Correctional Institution	Corrections	Prison/Incarceration	207.5	93.2	Corrections

UNNECESSARY COSTS SPENT ON UTILITIES

Due to rising electricity costs, utility bills in ACC increased by $1.26 million between 2007 and 2014, enough to fund 20+ ACCUG local government staff members. Energy rates, set by Georgia Power, Inc., have climbed by 30 percent (from $0.09/kWh to $0.12/kWh). Some of the most inefficient buildings (Figure 6) also operate with energy cost intensities ($/ft2) well above the ACCUG median. For example, the Clarke County Correctional Institution costs $3.52/ft2 (0.328 standard deviations above the median ACCUG energy cost intensity of $1.63/ft2). An upward and unsustainable trend in total energy expenditures compared to ACCUG's most efficient year (2012) can be observed in Figure 7. Total electricity and natural gas costs have climbed from $1,519,735 in 2012, to $1,562,170 in 2013, to $1,581,930 in 2014 (Portfolio Manager 2016b).

Figure 7: Annual ACCUG facilities energy expenditures (Saunders 2016)

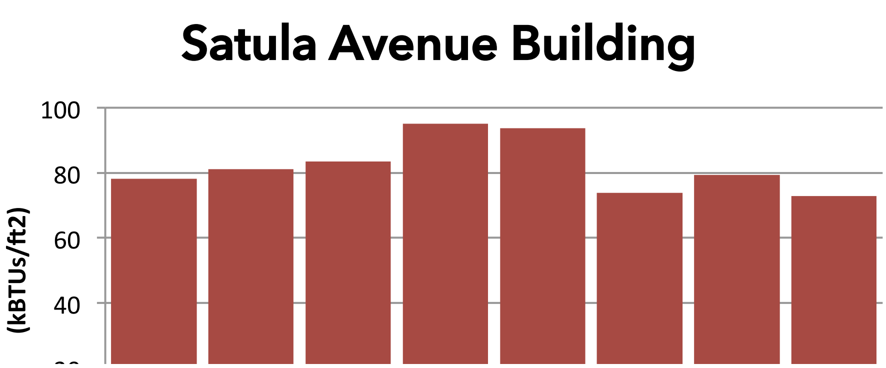


In the last 7 years, only a handful of buildings have been upgraded based on recommendations provided by intermittent energy audits (Saunders 2016). After 10 building upgrades with a median of 28.9 percent EUI reductions (relative to the baseline year), ACCUG avoided spending $127,000 on utilities in 2014. Theoretically, as more buildings are upgraded, savings would gradually increase. But energy efficiency has not received the political priority necessary for implementation in the last eight years (ACCUG 2016e).

ACCOUNTABILITY GAPS BETWEEN THOSE WHO USE AND PAY FOR ELECTRICITY

Among the 91 ACCUG buildings, 11 are multi-use facilities (occupied by more than one department). Currently, the Central Services Department, rather than the individual consumer, pays all utility bills associated with multi-use buildings. Because these departments are not monetarily responsible for their consumption, they face less pressure to utilize energy efficiently. Therefore, departments in multi-use buildings, such as the Finance, Housing & Community Development, and Human Resources Departments housed in the Satula Avenue building, can afford to consistently consume utilities at a higher rate than the national median (Figure 6 and Figure 8).

Figure 8: Annual Satula Avenue building energy consumption (Portfolio Manager



Failure to take initiative on energy efficiency, one of the lowest-hanging fruits of sustainable development, forces ACCUG to waste tax revenue on rising electric utility costs and fall short of sustainability goals, while setting a poor example for private and residential energy users (Klass and Wilson 2014). ACCUG must act within the next fiscal year, because continued complacency will threaten the county's long-run growth (Pitt and Bassett 2013).

IV: SOLUTION

The primary goals of this solution include:

1. Decreasing energy use intensity relative to buildings' previous year levels
2. Reducing the disconnect between those who consume utilities and those who pay for them
3. Creating a funding roadmap for using tax revenue

FISCAL ORGANIZATION AND ACCOUNTABILITY WITHIN THE COUNTY BUDGET

Rather than unevenly distributing utility bills, ACCUG should charge bills to a separate account called a Utilities Internal Service Fund (ISF). Then a charge would be allocated to each department on a monthly basis.

Departments would be responsible for paying utility bills for the facilities in which they are located. Thus, every department would feel the burden of paying for the electricity and heating fuel that it uses, rather than shifting that cost to other departments. This solution would address current issues with the Central Services Department paying utilities for five buildings that contain multiple departments—for instance, the Satula Avenue Building, which contains the departments of Finance, Human Resources, Organizational Development, and Housing & Community Development.

Per this solution, each department located in its own building pays its own utility bills based on its consumption in the previous year. The annual, weather-normalized site EUIs taken from Portfolio Manager corrects for uncontrollable weather events and unusual temperatures that could skew consumption data (e.g. unusually hot weather in 2016).

Buildings containing multiple departments will distribute total utility consumption based on occupied area. To ensure payment fairness, each tenant department will pay for a percent of the utility bill proportional to its occupied square footage. The costs should be divided according to individual responsibility. In a single-use building, the charge to a department would be based on the actual metered usage. In a multi-use building, different departments would be charged based on the even distribution of square

ALLOCATING TAX FUNDING REVENUE FOR CAPITAL IMPROVEMENT PROJECTS

On November 2, 2010, ACC voters approved a special-purpose local-option sales tax (SPLOST)—an optional $0.01 sales tax paid by regional citizens whose revenue can be used to fund community improvement or capital outlay projects (ACCUG 2016d). The tax is levied for five years, and the SPLOST has had bipartisan support across the state since its introduction. SPLOST legislation stipulates that revenues can only be applied to long-lived improvements to public infrastructure such as repaving roads, industrial plant construction, and energy efficiency. The ACC SPLOST Program, supervised by a SPLOST Oversight Committee and the mayor and Commission, consists of 33 community improvement projects, including an "Energy Sustainability Program." In FY17 approximately 90 percent of the $1 million allotted in 2011 remains (ACCUG 2016c).

With no future plan to execute capital outlay projects, ACCUG should utilize remaining SPLOST revenue ($930,000) for building efficiency upgrades (e.g., lighting, building envelope, or air conditioning systems retrofits) (ACCUG 2016d). The SPLOST monies should also be used to perform ASHRAE Level II energy audits on the 10 highest-emitting and most inefficient buildings relative to national median energy consumption and their energy performance of previous years. This data is available in Portfolio Manager (2016d). These assessments would cost between $500 and $1,000 per building and should be completed by the end of FY18.

The resulting recommendations for energy efficiency upgrades should begin by FY19. To avoid inefficiencies in heterogeneous upgrade implementation, overarching projects (e.g. lighting across all 10 buildings) should be bid out to separate contractors. SPLOST funding is set to stop accumulating in 2018, but money will remain for use until fully consumed. Creating a roadmap for this funding will help bring ACCUG on track to potentially reduce utilities consumption by 15 percent by 2025 (Saunders 2016).

USING THE SAVINGS GENERATED FROM ENERGY EFFICIENCY

When EUI reduces by a certain percentage every year due to building upgrades, the resulting cost savings should be distributed evenly among respective departments, the county's AOB, and the Utility ISF.

Redistributing a third of funds to departments would help prevent them from using even more energy as building systems become more efficient, defeating the purpose of the upgrades. As long as departments are reducing weather-normalized EUI relative to their own data in the previous year (stored in Portfolio Manager), they will receive money from EUI reductions to use on other expenses in their department. If savings have plateaued or EUI has not decreased relative to the previous year, then departments will neither be rewarded nor punished for maintaining current usage; they will just pay according to the allocation provided.

Year	Action

If a department exceeds its allocation, however, it can pull funds from elsewhere within its own budget to cover the shortage. In the event that a department exceeds its allocation due to no fault of its own, it could also appeal for additional funding from the Utility ISF. For example, if a server space that benefited all county departments was added to a particular building, then the tenant department could appeal for further utilities money from the Utility ISF. Such requests would fall under the jurisdiction of the Finance Department and County Commission.

As one-third of monetary savings accumulates in the Utility ISF, ACCUG can gradually reduce the amount that it allocates for this fund. Instead, that money can be used to meet other services demanded by citizens. The county would also benefit from savings applied to the AOB. The ACCUG primary utility provider, Georgia Power, maintains a target price inflation goal of 2.5 percent per year, and the additional savings to the AOB could cover these rising costs (Saunders 2016).

For instance, in 2014, the site EUI of the Central Services Simon Michael building site was 57.4 kBTU/ft2 and total energy costs equaled $3,077.64. If Central Services reduces its EUI by 5 percent to 54.53 kBTU/ft2 at the end of 2015, then its generated savings would amount to a total of $153.88. One-third ($51.29) would go back to the department, the county's AOB, and the Utility ISF (Portfolio Manager 2016b).

End of FY18	SPLOST monies used to audit (Level II ASHRAE) at least 10 of the oldest or highest-emitting buildings
	SPLOST monies used to implement building upgrades after audits and feasibility studies
	Identify staffing resources for project implementation
FY19 Budget	Utility ISF houses all utilities allocations
	Retrofit projects recommended by the 10 audits must be completed by FY2022
	Projects with upgraded buildings can use monetary savings from EUI reductions elsewhere in individual budgets

V: SUPPORTING ARGUMENTS

The three primary benefits of energy efficiency measures in ACCUG include: reduced carbon footprint, cost savings, and holding departments accountable for energy consumption. In addition to meeting this this triple bottom line, this proposal will advance other development ACCUG goals. This section outline lines why institutionalizing energy efficiency is not only urgent and in the county's best interest, but also feasible.

HARNESSING THE LOWEST-HANGING FRUIT OF ENVIRONMENTAL SUSTAINABILITY

Of all end-use energy reduction mechanisms, energy efficiency is the cheapest choice for maintaining consumer welfare while reducing greenhouse gas emissions and EUI (Brown 2015). Efficiency in buildings is particularly important because, due to urbanization, population growth, and infrastructure longevity, buildings are expected to comprise a significant component of energy use and local, national, and international GHG emissions. Thus, energy efficiency measures (EEMs) in existing and new facilities provide low-cost approaches to mitigating emissions from building operation. ACCUG could potentially reduce GHG emissions by between 12 and 18 percent by 2030 through the implementation of EEMs (Qui 2014).

IMPROVING ACCUG ECONOMIC STABILITY

The FY17 General Fund Operating Budget (largest component of AOB) is $121 million (4.3 percent higher than FY16), and for the last six years, the General Fund Operating Budget has grown at a rate lower than the combined 0.7 percent annual increase of the Consumer Price Index (CPI). For the ACCUG General Fund, FY16 actual and FY17 budgeted expenses exceed revenues, which is an unsustainable trend. As the city of Athens grows, more services are demanded of the government (e.g. sidewalk construction and pedestrian safety measures, transit frequency, EMTs in the Fire Department to improve emergency response times). The county, however, can no longer afford to invest in large capital projects that replace failing building systems, which could have been retrofitted earlier on in their lifetimes (ACCUG 2016g).

Building upgrades provide the opportunity for ACCUG to realize between 2.3 and 8.7 percent of electricity/natural gas cost savings every year. The life-cycle cost of saved energy would range from 1.2 to 5.2 cents per kWh of electricity. And the electricity and fuel demanded at peak times of the day would likely fall by 20 percent, further lowering utility costs (National Action Plan for Energy Efficiency 2009).

Though energy efficiency will reduce disparities between revenues and expenses as infrastructure becomes more productive through EEMs, ACCUG buildings will come closer to their optimal levels of EUI. There will be a point beyond which buildings cannot improve efficiency. But, given a trend of rising energy rates over the last eight years, efficient use of energy will boost economic growth in the short run and promote sustainability in the long run (VividEconomics 2013).

SETTING A PRECEDENT FOR OTHER SECTORS

Although commercial buildings, which account for over 18 percent of total U.S. energy use, carry the most potential to maximize energy cost savings and GHG mitigation, policy implementation can become cumbersome across diverse public and private stakeholders: developers, tenants, property owners, utility providers, financial institutions, etc. Without initial action taken by the public sector, private actors are unlikely to engage in energy efficiency policy. While EEMs alone may not yield drastic communitywide energy and GHG savings, they can demonstrate immediate and tangible results and set the stage for future commercial initiatives (Pitt and Bassett 2013).

MODERNIZING BUILDINGS NOW BETTER PREPARES THEM FOR FUTURE UPGRADES

Energy efficiency provides a cost-effective method to optimize building systems prior to larger technological advancements. The National Renewable Energy Laboratory (NREL) found that the returns on investment in solar technology are more productive when host buildings are already energy efficient (Kandt et al. 2011).

Some of the most efficient ACCUG buildings are the best suited for advanced innovations such as solar technology. For example, the East Police Precinct building, whose EUI has declined by 38.2 percent relative to 2007 baseline levels, has the highest solar potential among all ACCUG buildings. With solar technology, the East Police Precinct building could generate 150 kW of electricity. Similarly, the

Facilities & Landscape Management building, already performing under half of its national median EUI (23.2 kBTU/ft2 compared to 49.6 kBTU/ft2), could generate 50 kW of electricity (Portfolio Manager 2016b).

INCREASING POTENTIAL FOR GREEN JOBS

Energy efficiency provides a vehicle to boost employment in local communities. In 2010, the American Council for an Energy-Efficient Economy (ACEEE) estimated that energy efficiency provided 830,000 jobs nationally. This approximation is predicted to grow by 3 percent every year. Specifically, lighting retrofits created 200 jobs across the country in the first quarter of 2015. Green building supported over 2.3 million jobs.

Consulting firm McKinsey & Company predicted that 600,000 to 900,000 new jobs across the country could be attributed to building efficiency by 2020. And, the ACEEE estimated that, by 2050, investments in energy efficient technologies could create 1.3 to 1.9 millions jobs. Given the positive correlation between implementing EEMs and job creation, ACCUG should prioritize this proposal (EESI 2015).

ACTING ON PREVIOUSLY DEFINED COMMUNITY GOALS

The Athens-Clarke County Mission Statement reads:

> "Athens-Clarke County, an open and responsive government, facilitating a positive environment for individuals to obtain a high quality of life and local organizations to achieve success by providing innovative, high quality services and responsible stewardship of the community's resources, to benefit current and future generations."

According to Mayor Nancy B. Denson, fulfilling this mission will lead to the Athens ideal: "to leave our community better than we found it." In addition to the energy conservation-specific objectives outlined by the Mayor and County Commission, this proposal aligns well with the overarching principle of ACC governance. By implementing energy efficiency through systematic upgrades, financing, and consumer accountability, ACCUG will exercise "responsible stewardship" of tax revenue and public infrastructure. Further, saving money on utility costs will allow ACCUG to reallocate funds toward meeting increased demand for other county services as population increases (ACCUG 2016f). Updated and upgraded buildings will reduce the county's carbon footprint and improve environmental quality for the "benefit of current and future generations" (Brown 2015).

REDUCING THE DISCONNECT BETWEEN USERS AND PAYERS

In order to shrink the accountability gap between those who consume utilities and those who pay for them (currently, individual departments pay for single-use buildings and the Central Services Department pays for multi-use buildings), this proposal recommends that all ACCUG departments receive direct utility charges. Often, improving energy efficiency results in higher energy use because upgrades lower the cost of consumption and free up funds for other energy-consuming activities. Thus, departments should individually be charged based on their previous year's consumption, which would ideally decrease as EEMs are implemented (Tanton 2008).

VI: EXAMPLES OF SUCCESS

The Clarke County Cooperative Extension office serves as the gold standard for EEM implementation and energy/cost savings. In 2007, this 3,100 square-foot building consumed 194,000 BTUs of energy per square foot and cost $7,700 every year in utilities. After a series of energy upgrades in 2014, the building reportedly consumed 100,000 BTUs per square (nearly 50 percent reduction) and cost $4,800 in energy expenditures. The building reduced its GHG emissions output by nearly 50 percent (Portfolio Manager 2016b).

From 2007 to 2014, ACC undertook lighting projects to reduce the energy intensity of the poorest-performing buildings. In 11 county facilities, exterior lighting systems were upgraded to low-emitting diode (LED) lighting. In five buildings, interior lighting was upgraded to newer compact fluorescent (CFL) systems, and insulation, motion switches, ductwork, and other features were upgraded on an as-needed basis (Saunders 2016).

Lighting retrofits, which are among the most common EEMs, provide insight into the costs and benefits associated with technological upgrades. Figures 10 and 11 evaluate four lighting technologies: incandescent, halogen, CFL, and LED. Assuming that each bulb runs for six hours every day with similar brightness and that electricity costs $0.2136 per kilowatt (kW), LED lighting seems to be the best choice. LED bulbs demand the least energy, have the longest lifespan, and generate the lowest environmental output. These benefits justify upfront capital costs and longer payback periods relative to other lighting options (Rácz 2013).

Figure 10: Number of lamps required to produce 25,000 hours of medium-white light (Navigant Consulting, Inc. 2012; OSRAM 2016)

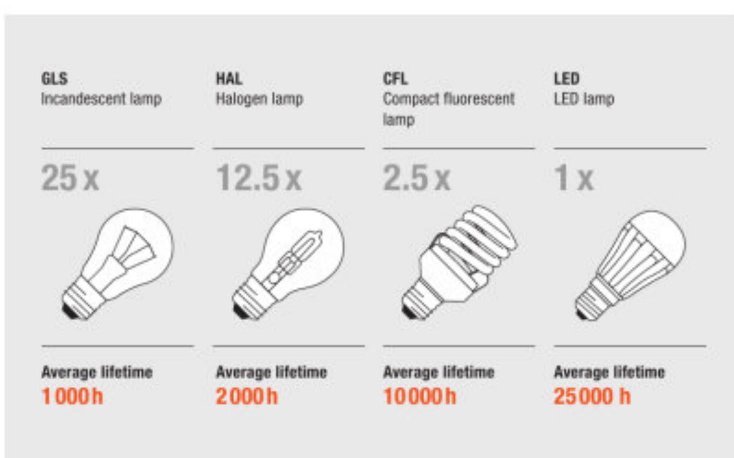
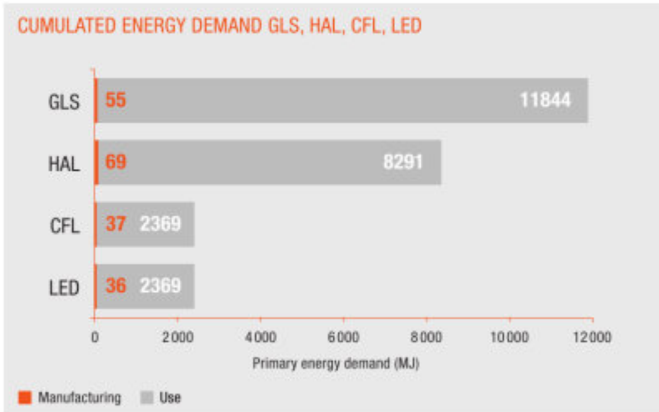


Figure 11: Cumulative energy demand (25,000 hours of medium-white light) (OSRAM 2016)



VII: IMPLEMENTATION CHALLENGES

This section outlines potential challenges to implementation posed by ACCUG decision makers and consumers.

Though this proposal does not require ACCUG to provide any additional capital for EEMs, the Finance Department and County Commission may oppose altering an AOB structure that has been in place for several decades. Establishing and maintaining the proposed Utility Internal Service Fund (ISF) requires staff time, perhaps through an Energy Conservation Coordinator position.

ACCUG can look to other communities for examples on how to administer and maintain a Utilities ISF. Albany, GA, established a similar Energy Control ISF to support the city's utility divisions. A team of 31 full-time staff goes beyond allocating funds ($3,557,693 for FY17) to county departments and oversees management and technical/customer support. This group would be similar to an "Energy Conservation" team of full-time ACCUG staff members dedicated to funding departments based on previous years' utility costs and ensuring the progress of energy audits and EEM implementation through SPLOST revenue (Albany 2016). In Florida, the City of Fernandina Beach manages an ISF comprised of three subparts that supervise city vehicle maintenance, utilities billing, and utilities administration. The Fernandina Beach Utility Billing division, controlled by its Finance Department, allocated $434,500 for utility costs and staffing four full-time and one part-time position in FY15 (Fernandina Beach 2015). Cities such as Fremont, NE, and Miramar, FL, also have similar ISF models to cover utility costs within public infrastructure.

Departments in multi-use buildings, that have paid utility bills before, may object the way utility costs are divided per this proposal. Rather than dividing monthly costs evenly by occupied square-footage, departments may argue for sub-metering devices. Irrespective of total occupied area, certain departments may consume more energy than others (e.g., heavy use of printers or water). Sub-meters would measure the exact EUIs of individual consumers and prevent certain departments from unfairly bearing the burden of others' high consumption. However, installing sub-meters would restrict the flexibility of tenant departments to expand or contract within these multi-use buildings.

The ACCUG SPLOST Oversight Committee may criticize this proposal for applying "Energy Sustainability" SPLOST revenues to existing building upgrades without detailed information on the capital and maintenance costs and payback periods of EEMs. Investing SPLOST monies into ASHRAE Level II or III energy audits and feasibility studies, however, can help solve this issue. Subsequent system upgrades could be financed using remaining SPLOST monies and Utilities ISF savings. This pipeline for implementation can help achieve a long-run positive economic and environmental impact (Cox, Brown, Sun 2012).

VII: CONCLUSION

The Athens-Clarke County Unified Government bears a duty to effectively allocate taxpayer dollars and promote a healthy environment. Currently, inefficient county buildings waste energy and emit preventable GHGs. As energy rates have increased over the past eight years, energy expenditures have risen in parallel. And within the county government, not every department is held accountable for paying its utility bills.

In order to fulfill the county administration's sustainability goals and responsibility to its constituents and the environment, ACCUG must implement this proposal between FY18 and FY19. ACCUG should utilize the $930,000 remaining in SPLOST revenue to perform energy efficiency measures in county buildings, beginning with the 10 most inefficient and expensive. This policy calls on ACCUG to draw from a Utility Internal Service Fund to allocate utility bills and hold departments accountable for their energy consumption. With this capital accounting structure, ACCUG can organize all utility expenditures in a central fund that rolls over annually. The cost savings accrued through energy efficiency upgrades could then replenish this account. Over time, ACCUG could gradually decrease the portion of its AOB spent on utilities.

This policy proposal employs existing information and financing tools to institutionalize energy efficiency in Athens-Clarke County. Reducing energy use intensity, greenhouse gas emissions, and utility costs will improve ACCUG's stewardship of public finances and the environment. Through energy efficiency policy and sustainable funding, ACCUG can achieve the "Athens ideal: to leave our community better than we found it" (ACCUG 2016f).

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