Greenlighting Efficiency: Improving Montgomery County's Approach to Energy Infrastructure

AUGUST 11, 2023

WAHID ISHRAR, SUMMER FELLOW
SYRACUSE UNIVERSITY

Prepared for the Montgomery County Council

Executive Summary

Reducing greenhouse gas emissions is both a state and county priority, as visible in Governor Moore's recent executive order and the council's unanimous support of Bill 16-21. One way the county is reducing emissions is by ensuring that county infrastructure is energy efficient.
In 2014, Montgomery County contracted 3 ESCOs, and by 2017, completed construction on 6 bundles of projects. The county has many additional energy performance projects in the pipeline. However, before adopting new projects, some challenges must be addressed.

This paper addresses the two primary challenges of the ESCO contract structure and project misalignment, using a case study of a completed project and its tracked utility bills and greenhouse gas emissions to identify the challenges. It then offers three recommendations on the best steps to move forward, including amending the contracting approach, increasing project alignment, and investing in the pre-existing expertise among County employees. It suggests potential avenues for further research, including studying the successes and drawbacks of comparable regional governments and studying the equity implications of these projects, for a more holistic evaluation.

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About the Fellow

Wahid Ishrar is an M.P.A. candidate at Syracuse University, pursuing a concentration in State and Local Government Financial Analysis and Management. He is also the President of the Maxwell School's chapter of the International City/County Management Association.

Wahid got his bachelor's at the University of California, Los Angeles in International Development Studies and Political Science, and worked as a Policy Analyst in Bangladesh at icddr,b, an international public health research institute. Since starting his master's at Maxwell, he has shifted his interest to public finance, and completed the Montgomery County Summer Fellows Program placed in the Office of Management & Budget.

Acknowledgements

Thanks to the Montgomery County Council for hosting the Summer Fellows Program, with special thanks to Pam Dunn and Naeem Mia for their guidance and interest in the cohort's professional development. Thanks to Rachel Silberman and Mary Beck at the OMB, as well as the entire OMB staff, for their steadfast support. Thanks to the Department of General Services for their knowledge sharing efforts and hard work regarding the topics addressed in this paper. Finally, thanks to my fellow Summer 2023 cohort members for their friendship throughout the summer.

Disclaimer

The analysis, opinions, and recommendations contained in this report reflect only the views of the Summer Fellow and do not necessarily represent the views of the Montgomery County Council, the Montgomery County Office of Management and Budget, the Montgomery County Department of General Services, or any other parties referenced in this report.

Abbreviations

BEPS- Building Energy Performance Standards (Montgomery County Council Bill 16-21)
DGS- Department of General Services (in Montgomery County)
ECM- Energy Conservation Measures
EPC- Energy Performance Contracts
ESCO- Energy Service Companies
IGA- Investment Grade Audit
M&V- Measurement & Verification
"The county," or any iteration thereof- Montgomery County, Maryland

Section 1: Background

1.1 Context on ESCOs

In recent years, there has been a significant push to modernize government infrastructure in a manner that is both economically efficient and environmentally conscious. Measures taken to achieve these goals in existing construction are plentiful, ranging from replacing lights with LED lights, installing solar panels and rooftop gardens, and upgrading chillers and water wells. Typically, a governing body will contract external companies for the duration of this process. The goal of these

Energy Conservation Measures (ECMs) is to reduce energy costs, decrease operation and maintenance costs, and reduce greenhouse gas emissions.[1]

1.2 ESCO Timeline

One such way this is achieved is through entering into contracts with Energy Savings Companies (ESCOs) for a predetermined period. Once the contract is in effect, the ESCOs are beholden to a general timeline.

Figure 1: The ESCO timeline

1. Design Development: audit existing infrastructure and design ECMs.
2. Construction Documents: provide architectural and engineering plans to realize the ECMs.
3. Bidding and Negotiations: submit a formal bid for the costs, financing model, and estimated returns from the ECMs.
4. Construction: provide comprehensive services to implement the proposed ECMs.
5. Post-Construction: provide Measurement & Verification (M&V) to the client, as per the contract, on performance metrics after construction has concluded; this is usually done over the course of several years.

[1] U.S. Department of Energy. (n.d.). Energy Service Companies. Federal Energy Management Program (FEMP). Retrieved from https://www.energy.gov/femp/energy-service-companies

1.3 ESCOs and EPCs

The key distinguishing factor between ESCOs and other firms that offer energy-efficiency improvements is ESCOs' operation methodology, which is performance-based. The ESCO's compensation is directly tied to the savings their ECMs are able to generate. According to this contracting model, the ESCOs locate financing through external sources, install ECMs, and verify the cost savings. In turn, clients pay back the ESCOs with these savings. By nature, these contracts specify long payback periods for the ESCOs.[1]

Underlying most ESCO contracts are Energy Performance Contracts (EPCs).[2] While the client and ESCO enter an overarching contract between ESCOs and the client, EPCs are used for specific projects within the duration of the ESCO contract. The EPC entails the ESCO's responsibility for installing essential equipment, offering a performance guarantee, and defining the conditions for both initial and continuous payments from the client to the ESCO.

Section 2: Research Methodology

This study evaluates the effectiveness of Montgomery County's efforts to update existing infrastructure to result in energy savings and aims to offer insight on best practices moving forward.

In this paper, a multi-faceted methodology was employed to comprehensively investigate the subject matter. Data collection was conducted through an analysis of government budget documents, illuminating the financial aspects of energy efficiency projects. Additionally, insights were garnered through interview and meeting notes with County staff, specifically with the Department of General

[2] International Energy Agency. (n.d.). ESCO Contracts. Energy Service Companies (ESCOs). Retrieved from https://www.iea.org/reports/energy-service-companies-escos-2/esco-contracts

Services (DGS). The research was further informed by a thorough review of existing literature pertaining to ESCO contracting structures, offering a theoretical foundation for the study.

A significant aspect of the methodology involved examining Montgomery County's specific experiences with ESCO contracts. Comprehensive reviews of ESCO contracts with Ameresco, Energy Savings Group, and Noresco were undertaken to gain practical insights into the implementation of such projects. Furthermore, Internal Grade Audits (IGAs) were utilized to evaluate the efficacy and impact of energy efficiency initiatives within the County. Finally, data collected by DGS on both the greenhouse gas emissions and utility bills following ECMs were analyzed.

Collectively, the utilization of these diverse data sources aimed to provide a holistic and thorough understanding of the energy efficiency landscape and ESCO contracting practices within Montgomery County.

Section 3: Background and Context on Montgomery County and ESCOs

3.1 Statewide and Countywide Energy Efforts

The necessity of this study, in addition to identifying potential weaknesses and improvements, hinges on mounting pressure, both at the state and county level, to update existing infrastructure.

Maryland's Governor Wes Moore recently signed an executive order to double the state's energy spending and align new buildings and major renovations with the goal of net zero greenhouse gas emissions by 2045.[3] The order's goal is to "ensure that Maryland's state government leads by

[3] Governor of Maryland. (2023, May 18). Governor Moore Signs Executive Order Doubling Maryland's Energy Conservation Goal. Retrieved from https://governor.maryland.gov/news/press/pages/Governor-Moore-Signs-Executive-Order-Doubling-Maryland%E2%80%99s-Energy-Conservation-Goal.aspx

example in addressing the harmful impacts of climate change while saving taxpayers money through reduced state utility costs." One avenue through which this is being explored at the state level is through identifying potential EPCs for state owned infrastructure, especially those with high levels of greenhouse gas emissions. Finally, the order requires all departments in the state to implement measures in pursuit of their core missions to conserve energy.

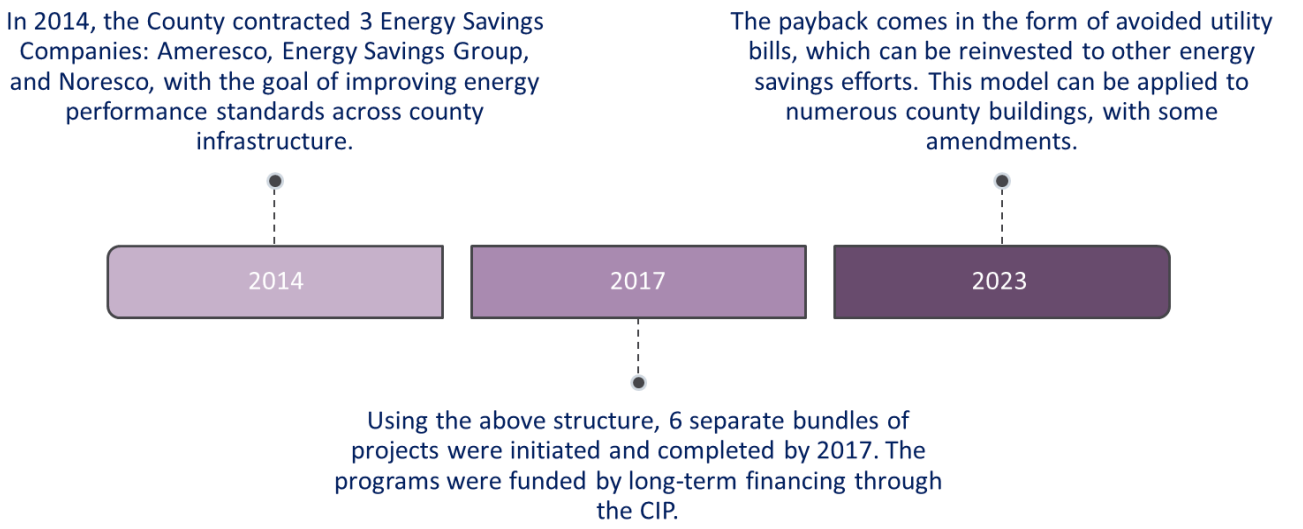
At the county level, on April 19, 2022, the County Council passed Bill 16-21, "Building Energy Performance Standards (BEPS)," and on May 02, 2022, County Executive Marc Elrich signed it into law. This bill sets a minimum performance standard for county and privately owned commercial and residential buildings in pursuit of carbon neutrality by 2035.[4] Buildings require such targets as almost 50% of community-wide emissions at the County result from energy use in buildings.

3.2 Montgomery County's ESCO Journey

As a response to statewide and countywide initiatives to introduce better performing infrastructure, Montgomery County began piloting an ESCO initiative to understand how this model could support the County's energy efficiency initiatives.

[4] Montgomery County Government. (n.d.). Building Energy Performance Standards (BEPS) Program. Montgomery County Department of Environmental Protection. Retrieved from https://www.montgomerycountymd.gov/green/energy/beps.html

Figure 2: Montgomery County's ESCO Timeline



In 2014, the County signed contracts with three ESCOs: Ameresco Inc., Energy Savings Group, and NORESCO. The duration of the contracts was for three calendar years, with EPCs for specific projects specifying the duration of M&V. The contracts state that the ESCOs provide services in pursuit of the "investigation, design, permitting, and construction of energy savings measures at various County facilities, on an as-needed basis." [5] They also specify that the County will initiate a Task Order for each construction project, wherein the three contracted ESCOs will have the opportunity to submit construction designs and savings estimates as bids for the projects. The ESCO that is allotted the bid is responsible for carrying out the terms of that Task Order, which includes the five steps listed in "Section 1.2" of this paper.

[5] Montgomery County Government. (2014). Contract for Energy Savings Performance Contracting Services between Montgomery County, Maryland and Ameresco Inc. signed 2/11/14, Contract # 1039155.

Utilizing this structure, the County initiated six separate bundles of projects, which concluded construction by 2017. Some of the ESCOs were for individual buildings, while others were for a collection of county infrastructure that were updated with ECMs and monitored together. They are referred to as “ESCO #1,” “ESCO #2,” “ESCO #3,” “ESCO #4,” “ESCO #5,” and “ESCO #6.”

3.3 ESCO Reform Required

Currently, there are no active ESCO contracts in the County. However, the County’s aging infrastructure is a known challenge, one that is already causing a drain on the County’s fiscal resources, as well as contributing to high greenhouse gas emissions. Paired with the statewide and countywide goals stated in “Section 4.1,” there is a demand for a more streamlined and comprehensive approach to updating energy infrastructure.

Before undertaking new construction or renovation projects of the nature tackled by ESCOs, there are some challenges identified during this research that should be addressed for maximum efficiency. The following case study will showcase both the strengths and drawbacks of the ESCO contracting approach.

Section 4: Case Study- Piccard Office Building

ESCO #2, the Piccard Office Building, is an ESCO project that began construction in 2014 and concluded in 2017. This project bore a cost of $3.6 million. The implemented ECMs were projected to save the County around $181,000 annually, with a 19-year payback period on the investment.[6]

[6] Ameresco Inc. (2015). Final Investment Grade Energy Audit Prepared for Montgomery County HHS. August 21, 2015.

With tracking data from DGS, from FY2017 to FY2023, after construction concluded in 2017, the renovations have managed to reduce costs by about $111,000 annually, or about 61.3% of the estimates provided by the ESCO.

Furthermore, the greenhouse gas emissions have reduced significantly, as can be observed in Figures 3 and 4. The emissions have been reduced overall by almost 50% per year, post-construction.

Figure 3: ESCO #2 Total Emissions, 2016

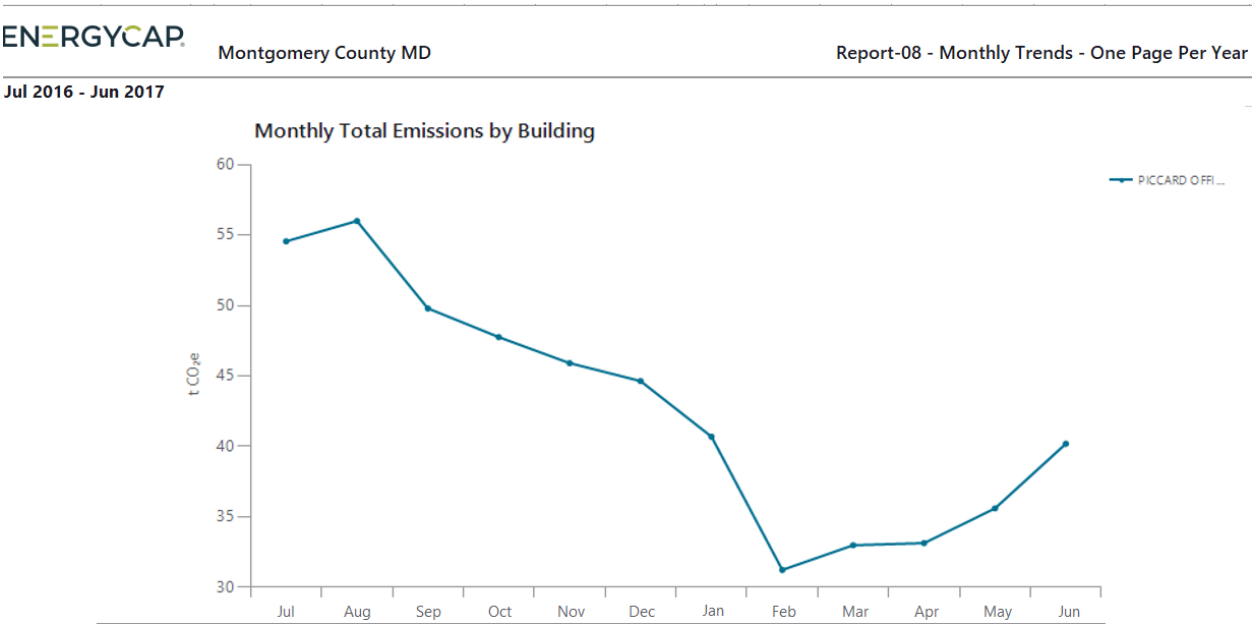
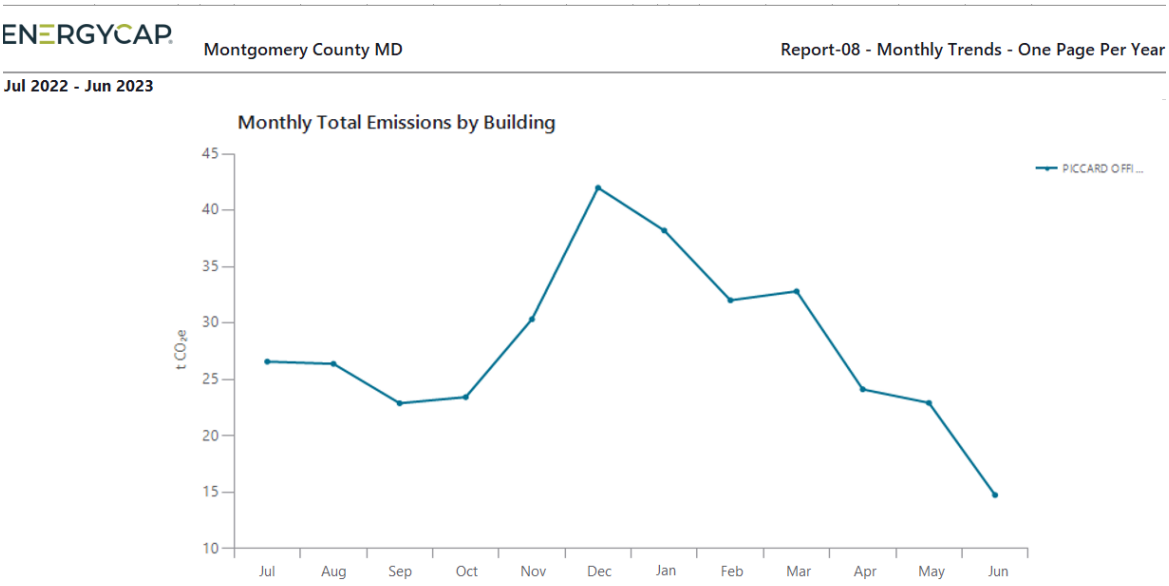


Figure 4: ESCO #2 Total Emissions, 2022



The above data is promising, as it demonstrates that both reduction of utility bills and reduction of greenhouse gas emissions are being achieved by the ECMs. The challenge lies in the fact that, for varying reasons that will be explored in the next section, the target set for utility bill reduction is not being reached.

Section 5: Challenges

5.1 Challenge #1: ESCO M&V Inefficiency

While the above case study depicts one such instance, in the case of most of the ESCOs, impressive savings are being realized; however, due to a variety of reasons, such as unpredictable occupancy of buildings, fluctuating temperature requirements, and changing demands on the workspace, the estimated savings that the ESCOs projected are not being reached.

This is a challenge for the County as typically, in the case of a contract with an ESCO, if the usage guidelines they set are adhered to and the estimates are inaccurate, the companies are responsible for reimbursing the County for the difference. As this is a risk assumed by the ESCO, typically, companies estimate about 2-10% of total project costs for M&V purposes (this can vary by project and contract terms).[7]

Since the demands on the buildings from the County are higher than the ESCOs estimates, the County is unable to recoup the difference between the estimated savings and the actual savings from ESCOs. While the savings the County is making because of the ECMs are aligned with its targets, the cost for M&V can be avoided.

[7] University of Texas at Austin. (2015, December). Measurement & Verification (M&V) Framework. Retrieved from https://utilities.utexas.edu/sites/uem.utexas.edu/files/M%26V-Framework.pdf

5.2 Challenge #2: Project Misalignment

In Montgomery County, there are 4 CIP projects working towards the common goals of reducing greenhouse gas emissions and utility bills. These projects do have varying contracting approaches and structures. They are identified in Figure 5. Due to the differing nature of how the funds are structured, usage and monitoring issues may arise.

Figure 4: Montgomery County's CIP Projects

Project Code	Project Name	Project Description
P507834	Energy Conservation: MCG	The project supports efforts yielding rapid financial returns to the County or substantial progress towards established environmental goals, such as energy savings, renewable energy installations, greenhouse gas reductions, and waste diversion.
P361302	Energy Systems Modernization	This project provides a means to implement energy savings performance contracting as a mechanism to reduce the County's energy usage and perform strategic facility upgrades with significantly reduced capital costs.
P362105	Exelon-Pepco Merger Fund	This project provides for the design and implementation of energy savings projects in various County facilities and locations using funds obtained through the merger of Exelon Corporation, Pepco Holdings Inc., Potomac Electric Power Company, and Delmarva Power & Light Company. Projects include lighting retrofits, heating, ventilation, and

		cooling (HVAC) controls upgrades and equipment replacement including chillers, condensing units and air handling units.
P362106	AltaGas-WGL Merger Fund	This project provides for the design and implementation of energy savings projects in various County facilities and locations using funds the County received as part of the merger of AltaGas Ltd., WGL Holdings, Inc., and Washington Gas Light Company. The funds will be administered by the Department of General Services (DGS) for projects such as combined heat and power (CHP) systems (also known as cogeneration), thermal envelope components (such as insulation), boiler upgrades, and increasing the energy efficiency of facilities.

Section 6: Recommendations

6.1 Recommendation #1: Move to an EPC Structure

This paper's first recommendation is to remove the ESCO model and move to an EPC model. While ESCOs are underpinned by EPCs, ESCOs by nature require an M&V in the post-construction phase. While it is possible to tailor the County's building usage to fit the usage guidelines, doing so would increase administrative burdens on the County.

Instead, the County can move to a model whereas the need for energy efficient construction or renovation arises, Task Orders can be issued for all ESCOs that want to participate. EPCs can be signed as needs arise, with a limited scope for design and construction only.

This approach would increase competition among ESCOs within the region as more companies would be allowed to participate in the bidding process. The County would not be bound to specific ESCOs. Additionally, it would offer the County more flexibility to tailor contracts to project needs. Most importantly, this approach would remove the burden of attempting to meet M&V standards, eliminating a portion of the costs for future energy infrastructure related projects.

6.2 Recommendation #2: Increase Project Alignment

This paper's second recommendation is to increase project alignment. Of the four CIP projects, the two newer merger funds are already utilizing an EPC model. As previously established, the County has an aging infrastructure, and there are interventions being made utilizing the merger funds. However, their scope is limited and conditional upon meeting merger criteria.

After consolidating appropriate projects, the County should develop new protocols that streamline a standard contract for EPCs and apply them across the board on energy infrastructure projects.

6.3 Recommendation #3: Invest in Existing Resources

This paper's third recommendation is to invest more resources into developing talent within the County that can participate in monitoring progress data. The County's access to a wealthy database of knowledge regarding utility savings is in part due to the expert capabilities of its existing staff. However, if the demand shifts exclusively to County staff to provide this resource, more highly trained staff will be a requirement. Additionally, the County should consider having internal talent that can judge whether the estimates submitted by the companies under EPCs are feasible.

Section 7: Potential for Further Research

7.1 Regional Comparisons

Fairfax County is in the typical process described in "Section 1.2" of this paper, having contracted with two ESCOs from a list of fifteen competitors to update infrastructure owned by Fairfax County and Fairfax County Park Authority-owned facilities. They appropriated $6.9 million in FY2019 and FY2020 as a pilot program to evaluate five county facilities. Future work was set to rely on the success of the pilot program.[8] In their FY2024-2028 Approved CIP, they have about $17 million allocated to continue work on the pilot program.[9]

The state of Maryland applies a similar approach to Fairfax County, but with more options to choose from. Currently, there are nine active ESCO contracts with the state.[10] These ESCOs have the opportunity to bid on EPCs as they arise.

Howard County relies on internal mechanisms for their energy efficiency projects through the "Energy Management/Improvements" project.[11] They are in the process of auditing existing infrastructure to identify potential improvements. They are relying on an established Utility Bill Management system to identify, prioritize, and track energy infrastructure efforts.

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[8] Fairfax County Government. (n.d.). Fairfax County Announces Agreements with Two Energy Service Companies. Fairfax County Department of Public Works and Environmental Services. Retrieved from https://www.fairfaxcounty.gov/environment-energy-coordination/news/fairfax-county-announces-agreements-two-energy-service-companies

[9] Fairfax County Government. (n.d.). Fairfax County Capital Improvement Program (CIP) - Fiscal Year 2024. Retrieved from https://www.fairfaxcounty.gov/budget/sites/budget/files/assets/documents/fy2024/adopted/cip.pdf

[10] Maryland Department of General Services. (n.d.). Energy Performance Companies. Retrieved from https://dgs.maryland.gov/Pages/Energy/Performance/Companies.aspx

[11] Howard County Government. (2023). 2024 Executive Proposed Capital Budget Book. Retrieved from https://www.howardcountymd.gov/sites/default/files/2023-03/2024%20Executive%20Proposed%20Capital%20Budget%20Book.pdf

For a comprehensive analysis of Montgomery County's best steps moving forward, the county may schedule meetings with other regional governments to learn about the successes and challenges they have faced in their approach to energy efficiency projects. For example, the state of Maryland may be having a more valuable experience due to the inherent competition between nine ESCOs as opposed to three. Similarly, the County may learn that Howard County's approach to internally tracking energy savings is not as efficient due to a lack of ESCO expertise.

7.2 Equity Implications

This paper has not explored the equity implications related to energy efficiency projects, and further research in this area should focus on analyzing such impacts. It could be helpful for the County to know the relationship between the construction projects that undergo energy efficiency improvements and the communities they are housed in, along income levels or social demographics. Additionally, if construction projects are undertaken for energy improvements, it could be helpful to align accessibility improvements to the overall construction plan.

Section 8: Conclusion

This paper conducts an initial appraisal of Montgomery County's ongoing efforts to enhance energy efficiency within its infrastructure—ultimately curbing utility expenses and curbing greenhouse gas emissions. The county's current strategy pertaining to ESCOs reveals room for optimization. Embracing an EPC framework has the potential to infuse heightened competitiveness among ESCOs while affording the county greater dexterity in earmarking resources for ECMs. Through collaboration between the County Council, County Executive, and various departments, there is opportunity to fortify the current approach.