The Problem

With buildings accounting for 36 percent of the energy used in the U.S. and 65 percent of the electricity used, it has become imperative for owners to start implementing system upgrades and retrofits; not only would these improvements save money in the long run, they would also help companies meet the ever evolving standards set by the government for emissions. However, when asked, 76 percent of construction firms cite initial cost as being the biggest obstacle for owners when project planning. In response to this need, Energy Service Companies began offering a service called energy performance contracting. This is a turnkey service that not only designs and plans a project implementation, but it also provides complete financing, lifting the initial cost burden from owners. With a large investment such as this, a way to verify energy savings is necessary. This verification comes from another service called measurement and verification. These services combined make it possible for owners to make the needed upgrades to their systems.

M&V General Process

![Image of General Approach Process Guide]

Figure 1: General Approach Process Guide

Energy Inputs

![Image of energy inputs chart]

Figure 2: Scaled Chart of One Year of Data Collection

Cost Savings

![Image of cost savings chart]

Figure 3: Cost Savings Calculated Using Program

Domains of Sustainability

Built
- Reduce building emissions
- Retrofit existing buildings that would otherwise be torn down due to building system quality
- Provides attainable and affordable means for retrofitting buildings

Natural
- Reduce building emissions, therefore, increase air quality
- Reduces the amount of resources required to operate a building or industrial process

Social
- Increases environmental awareness among company owners and employees
- Promotes healthy business practices as well as healthy lifestyle practices among company employees

Energy Savings

![Image of energy savings chart]

Figure 4: Cost Savings Calculated Using Program

Closing Remarks

Since no project was commissioned at the time of this project, controlled data was used for all calculations. However, the process of data collection and data analysis still proved to be an invaluable experience for a young engineer striving towards energy engineering. This project not only gave me the opportunity to work in the energy engineering field, but it also gave me a better understanding of the importance and process in achieving energy conservation. I was introduced to the realistic process of energy engineering by beginning this project from scratch and delving into the protocols and standards in order to create a compliant program. Buildings are not going to cease consuming energy, therefore, it is imperative that measures such as M&V are utilized in order to make the most of each system and source.