U.S. General Services Administration

Aim For Net Zero Oklahoma

presented by
Steve Rutledge

PROJECT OVERVIEW

Goal: Improve overall **building efficiency, power reliability** and **resiliency**, and **lower energy**

GSA engaged in a **Utility Energy Service Contract** (UESC) with **Oklahoma Gas and Electric** (OG&E)

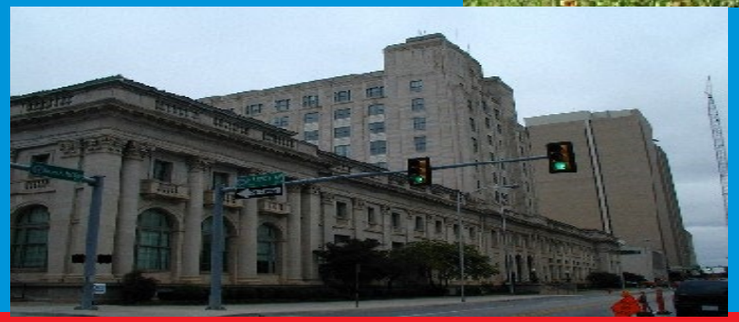
Part of a five-building retrofit that is projected to save **$13.5 million dollars** over the course of the contract and account for a **41% reduction** in total energy use and **2,800 metric tons of carbon** reduction annually

OKC Federal Parking Garage

OKC Holloway USCH

OKC Federal Building

OKC Post Office Courthouse



Muskogee Ed Edmondson USCH

KNOW YOUR ORGANIZATION/SITUATION

Before GEB - Doing the Contracting Itself - Build Your Team!

- Energy Team
- Acquisition Team
- Other parts of the organization - Project Managers, Subject Matter Experts, Portfolio, Budget, Central Office Contacts, Senior Leadership Team, Field Office Locations, Utility Partners, ESCO Partners, DOE FEMP Partners

Sell the Vision and Expectations!

- Build the Foundation
- Show the Benefits
- Leverage What You Can

GEB BLUEPRINT

Key to the success of a GEB project is:

- Site selection with utility rates and incentives favorable to GEBs;
- Identification of GEB measures early;
- Stakeholder engagement;
- Integration of GEB measures within major building renovations; and
- Careful consideration of GEB measurement and verification methodologies.

GEB Strategies and Technologies

Solar PV Array

- Addition of a 300 kW PV array on the roof of the building to capture solar energy.
- **Benefit: Generation**

LED Retrofit

- Lighting fixtures were upgraded to LEDs which are controlled in the Lutron control system.
- **Benefits: Efficiency & Shedding**

Lighting Controls

- Lutron smart control systems with ability to automatically dim or turn off lighting during demand response events; integrated with the battery system.
- **Benefits: Shedding**

Transformer Upgrades

- Installed more efficient transformers so less of the energy was wasted as heat.
- **Benefit: Efficiency**

Building Automation System

- Implemented more efficient control strategies for HVAC and lighting equipment loads.
- **Benefits: Shedding and Shifting**

Smart Irrigation System

- Installed smart irrigation controls that are used for water conservation.
- **Benefit: Water conservation**

Battery Storage

- Microgrid controls with a 250 kW battery storage system interconnected with the rooftop PV system; required separate control system.
- **Benefit: Shifting**

Advanced Power Strips

- Advanced power strip that can shut off unused outlets through various means of sensing (e.g., current sensing, IR, motion).
- **Benefits: Efficiency & shedding**

Roof Upgrade

- Adding the PV array required the roof to be updated, which provided additional energy savings.
- **Benefit: Efficiency**

OKLAHOMA CITY FEDERAL BUILDING GEB STRATEGY

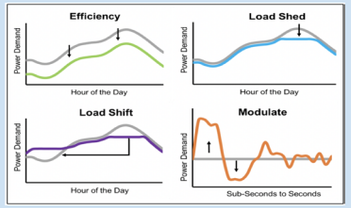
Energy Efficiency

- LED Lighting
- Lighting Controls
- HVAC Controls
- Transformer Upgrades
- Advanced Power Strips
- Building Insulation

Renewable Energy

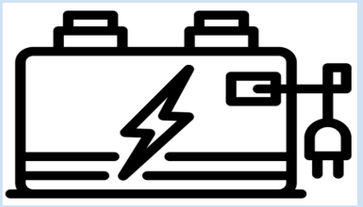
- 300 Kw Solar Rooftop PV
- Utility billing rate changes

Load Flexibility/Controls



- Microgrid Controller
  - Lighting Controls
  - HVAC Fans
  - PV Production
- Load Shedding
- Net Energy Exporting

Energy Storage/Resiliency



- 250 kw / 500 kWh BESS
- 250 kW Emergency Generator (existing)
- Island Mode Operational Capability

CHALLENGES AND OBSTACLES

- **GEB Integration and Coordination - Dealing with multiple buildings and combined utilities that share GEB strategies proved challenging from a coordination and integration standpoint**

- **Historical lighting -** The obsolete and historical lighting fixtures made retrofitting more difficult because of restrictions on how the fixtures were handled. Adding controls and integrating the lighting controls into the BAS was also a challenge

- **Controls Integration** - Large quantity of systems (lighting, PV, BESS, HVAC) that needed to be updated and connected to the existing GSA system. The additional security requirements for the site as a government facility added another layer of challenges for the team members involved with the integration

- **COVID – 19 -** COVID-19 created supply chain issues around planning and material. GSA said they had fortunately ordered many of the parts and finished the preliminary phases of the project before COVID-19 emerged as a global pandemic, so they were able to successfully navigate the supply chain issues that arose

- **Utility Rates -** Utility rates are very low in Oklahoma relative to the rest of the U.S., payback periods were generally less favorable for technologies, making the selection process more challenging

ADVICE AND LESSONS LEARNED

- **PROJECT FACILITATOR** - Hire a project facilitator in the design phase before construction and implementation begins.

- **COLLABORATION AND TRANSPARENCY** - Strong collaboration with the utility lead and having the same person from the ESCO stay on through the entire project were beneficial. The teams met on a weekly basis for most of the project timeline which was instrumental in keeping all the members involved.

- **TECHNICAL EXPERTISE** - Have the right SMEs involved to help with technical issues that arise. This was especially important with BAS issues in this project.

- **TECHNOLOGY SELECTION** – Ensure the team assures that the technologies comply with required Buy American Act requirements and be prepared to assist the local team with proper operations and maintenance procedures as the equipment is turned over to them. Revisit training and maintenance concerns as needed.

GSA
steve.rutledge@gsa.gov
512-801-7296


GSA