Real Savings – A Successful Energy Performance Contracting (EPC) Case Study

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Learning Objectives

- Arkansas State University Background & Why Performance Contract?
- State of Arkansas Energy Performance Contracting Code
- ESC Process, Initial Scope, and Approved Scope
- Executed Scope Details & To-date Performance Results
- Lessons Learned, Keys of Success, Campus Constituent Feedback
- Post ESC Campus Operational Goals and Initiatives
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Arkansas State University Background & EPC Justification

- Located Jonesboro, AR – 71,515 population
- Doctoral Research High Activity Carnegie Class
- Campus Metrics
  - 4.3 million gross square feet; approx. 980 total acres, 573 ac maintained
  - 173 buildings; Average age 39 year; 60+ Bldgs. pre-1990 Construction
  - Fall 2019 Enrollment – 13,981; 3,400 On-Campus Residents
  - FM Staffing – 243 total FTE (approx. 91% occupancy rate)
- Deferred Maintenance and Capital Renewal Needs Pre-ESC
  - $340 Million Maintenance Needs
  - $38 Million Capital Renewal Needs & Critical Maintenance
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Arkansas State University Background & EPC Justification Cont.

- AR Legislated Energy Conservation – Act 1494 of 2009
  - 30% Utility Reduction (FY-2008 Baseline) by 2017
  - Electricity, Natural Gas, and Domestic Water
- Campus Historical Growth and Trends
  - 2005 vs. 2015 – 100 Buildings (+57%); 3.5 Million GSF (+20%);
    10,508 enrollment (+28%)
  - By 2025 – 4.5 Million GSF; 14,000?? Enrollment, No planned Building
    Retirements, No Anticipated New State Funding
  - “What if…” scenario of the 2025 enrollment crisis, need cost
    management strategy (energy conservation and operation savings)
ALL FACTORS OF CAMPUS GROWTH or DECLINE, INCREASING AGE OF BUILDINGS & INFRASTRUCTURE, MANDATED UTILITY CONSUMPTION REDUCTION, INCREASING MAINTENANCE AND CAPITAL RENEWAL – ETC........ WHAT IS THE BEST STRATEGY TO MEET NEEDS AND EXPECTATIONS?

Best short-term strategic option for AState was an Energy Service Performance Contract, to address energy conservation expectations and maintenance needs without increasing campus debt service, AND produce long-term cost containment.
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Arkansas Energy Performance Contracting Code

- AR Legislation – Guaranteed Energy Cost Savings Act 554 of 2013
  - 2013 amendment allows Maintenance & Operational cost savings to cover debt service, combined with Utility cost savings
  - M&O cost savings can include average annual repair cost, future maintenance or replacement cost, and labor burden
  - Financing term is limited to 20 years
- Program is managed through Arkansas Energy Office; however, AState received permission to directly solicit ESCO firms in July 2014
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ESC Process, Initial Scope and Executed Scope

- AState selected Johnson Controls, Inc. in September 2014 – Competitive RFQ
- RFQ stipulated:
  - Campus buildings to be included in Investment Grade Audit (IGA)
  - Utilizing AR Energy Office IGA contract and prescribed rate
  - Bidding process of sub-contractors, and Guaranteed Maximum Price Terms
- AState selected and procured Energy Management Platform (Entronix) as Owner managed reporting of Measurement & Verification pre-IGA
- IGA Owner / JCI kickoff meeting – October 2014
- IGA Completed February 2015
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EPC Process, Initial Scope and Executed Scope – Cont.

- 1st draft of Facilities Improvement Measures (FIMs) – March 2015
- JCI receipt of sub-contractor RFPs – April / May 2015
- 1st proposal of FIMs scope - > $40 Million scope, May 2015
  - Internal and external lighting, HVAC upgrades, CHW Plant, Controls, Domestic Water, Solid Waste Management
- Final approved FIMs scope - $15.2 Million, June / July 2015
  - Internal lighting, limited HVAC upgrades, Controls, Domestic Water, Solid Waste
  - Annual guaranteed savings - $713k utilities, $164k M&O (labor & material)
- Contract finalized October 2015
- JCI contractors mobilize late December 2015 (17 months from RFQ to start of work)
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Executed Scope Metrics and Measurement & Verification Results

- Lighting FIM ($662k gtd. annual utility cost savings)
  - > 27,000 lighting fixtures replaced / retrofitted to LED in 59 buildings, includes parking deck and First National Bank Arena
  - 7,642,000 kWh annual savings; equates 5,640 tons CO2 eliminated
  - Equivalent of 2,606 acres of trees, or 64 autos, or 767 homes heated

- Domestic Water Conservation FIM ($84k gtd. annual utility cost savings)
  - > 4,700 fixtures replaced / retrofitted in 78 buildings (855 toilets / urinals, 1,242 shower heads, 2,610 faucets)
  - 13,700,000 gal annual savings; equates 73,450 tons CO2 eliminated
  - Equivalent of 181 homes, or 23 Olympic swimming pools, or 761,000 showers
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Executed Scope Metrics and Measurement & Verification Results – cont.

- Solid Waste Management FIM ($16k gtd. annual cost savings)
  - Added (4) solid waste compactors and dumpsters on trailers that replaced >30 standard dumpsters
- Energy Management Controls FIM ($112k gtd. annual utility cost savings)
  - Replacing 3-way valves with 2-way valves
  - Replace pneumatic thermostats / controls with DDC thermostats / controls
  - Update Energy Management control schedules, sequences, strategies
- HVAC Systems FIM ($23k gtd. annual utility cost savings)
  - (5) High risk air hander replacements and (1) chiller (resiliency issue)
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Executed Scope Metrics and Measurement & Verification Results – cont.
Performance Contract project addressed approximately $13 million of maintenance needs and liabilities (fluorescent lamp obsolescence, resiliency of mission critical equipment)


Calculated and measured utility cost savings to date >$2.2 million
Operational Cost savings to date - >$495k
Total Contract savings (20 years) - $25.1 million (includes escalation rate)
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AState Master Electrical Consumption
Mar 2008 - Dec 2019

Fall 2008
11,490 enrollment
3.5 MM GSF

Fall 2019
13,600+ enrollment
4.3 MM GSF

Monthly Consumption - kWh


6,678,000

Arkansas State University
AState.edu /ArkansasState @ArkansasState

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Lessons Learned, Keys to Success, and Campus Feedback

- Don’t reinvent the wheel – seek advice from others with ESC experience
- Define all the expectations in RFQ / RFP – minimizes post RFP contract negotiation
- Select a provider with experience and ability to meet your expectations (flexible)
- Consider a CM at risk delivery option (bid subcontractors – GMP)
- Meet frequently and discuss findings & recommendations during IGA process
- Define and prioritize all your maintenance priorities pre-IGA (engage FM staff and campus constituent input)
- Have detailed building and systems asset inventory pre-IGA
- Have PC Contract drafted early in the process, seek examples from peers
- Define the Measurement and Verification expectations and process EARLY!
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Lessons Learned, Keys to Success, and Campus Feedback – cont.

- Have kickoff meeting with PC manager and all subcontractors to define campus policies and work expectations (ID, security, parking, communications with building liaisons, cleanliness, professionalism, tobacco free campus, etc.)
- Exercise any necessary contractor disciplinary issues (enforces expectations)
- Meet frequently (AState and JCI team met weekly)
- Solicit campus feedback and communicate proactively of schedule (advance notification)
- Complete issues and punch list items as you go (don’t procrastinate)
- Be flexible with scheduling, but leverage unoccupied times
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Post EPC Campus Operational Goals and Initiatives

- EPC did not achieve the 30% utility reduction mandate (~26%, 81 kBTU / GSF)
- Master primary electric meter interface, demand monitoring and global demand control / shedding (approximately 30% of total electricity cost)
- Expand Chilled Water Plants – retire aging building chillers (eliminate liability)
- Continue RCx program, exterior campus lighting to LED upgrades
- Pilot testing IoT devices for predictive / proactive maintenance
- Conceptually planning a utility grade Photovoltaic (PV) project (3-4 MW)
- Conceptually planning Operations Data Science / Facilities Informatics
- Will evaluate internal financing future projects in lieu of ESC delivery
Thank You!

Questions?

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