



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

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EPC – Real Savings Case Study

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)



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Arkansas State University Background & EPC Justification Cont.

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 handler 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)

Measurement and Verification for guaranteed savings began March 2017.

Calculated and measured utility cost savings to date >\$2.2 million

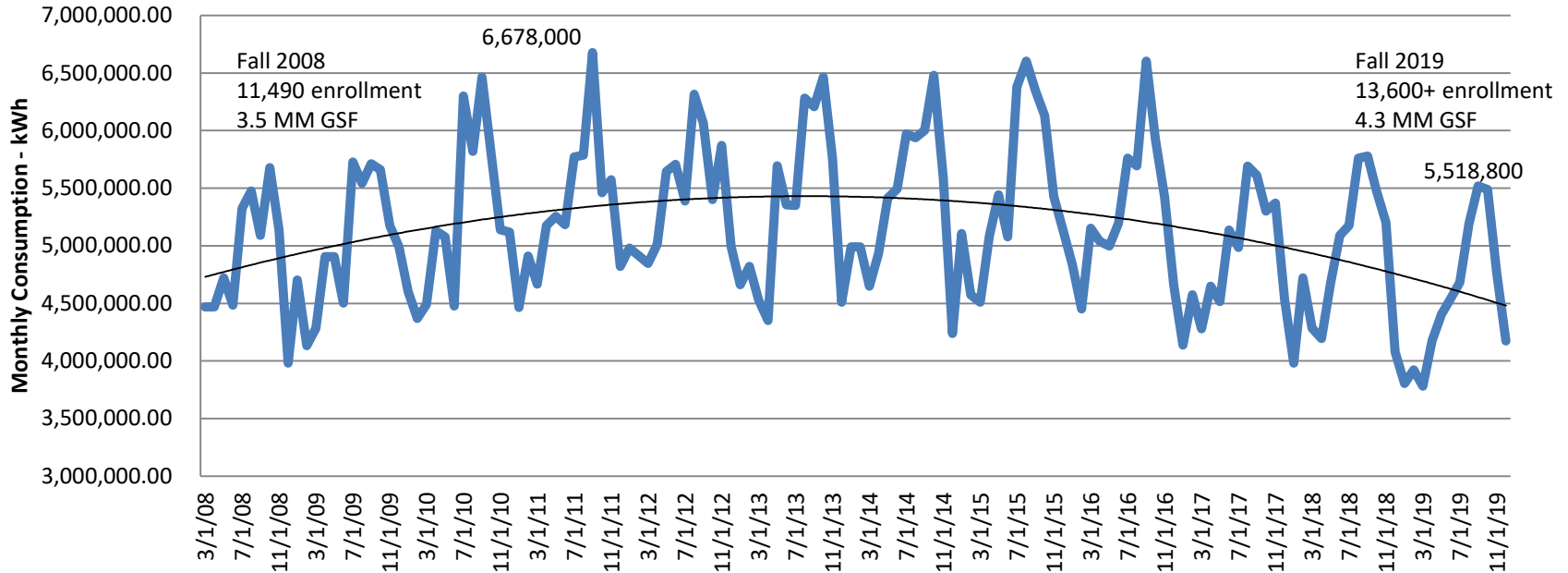
Operational Cost savings to date - >\$495k

Total Contract savings (20 years) - \$25.1 million (includes escalation rate)

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AState Master Electrical Consumption

Mar 2008 - Dec 2019



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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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