Innovative Contract Vehicle to Accelerate Campus Energy Savings

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Spoiler Alert: Temple selected an Energy Projects Construction Manager (EPCM) to Accelerate Campus Energy Savings

• This presentation focuses on why an EPCM was chosen by Temple as the contract vehicle
• We will detail some of the pros and cons of this vehicle versus others
• Another spoiler: it has generally been a successful engagement and we would probably do it again.
Introduction to Temple University

• Temple operates two large campuses in economically challenged North Philadelphia (plus several satellites both US and international)

• Main Campus 78 bldgs., 8,561,032 GSF

• Health Sciences Campus 2 miles north of Main, 30 bldgs. 3,844,221 GSF (including hospital)

• Total undergraduate enrollment of 29,550 students

• Continued growth in all areas
Introduction to Temple University (Cont...)

• State-related university receiving some portion of funding from Commonwealth of Pennsylvania
• Total energy expenditure including Hospital is about $26.5million/year
• Hospital is a separate legal entity but buys all energy products through university
• The Hospital was not part of this energy-savings procurement, choosing to pursue their own savings endeavors
Temple’s Position Relative to Center City Philadelphia – about 2 miles north of City Hall
Temple Main Campus and Health Sciences Campus – separated by about 2 miles.
Brief Introduction of Myself

• BS in Applied Physics and Electronics
• MS in Information Science
• Energy engineer since 1988, licensed PE in PA, passed the CEM in early 1990s, LEED AP since early 2000s
• Worked for consulting energy engineers, then an ESCO, then had my own energy engineering practice that I sold, then worked at another ESCO (including winning the EPCM at Temple) then...
• ...Energy Manager at Temple since August 2015
A Need for Successful Projects – A Desire for Transparency and Value

• In 2014 climate action planning and a desire for change freed up about $11 million in funding for energy projects.
• At that time Temple’s Energy Office was only approximately 1.3 people.
• Any implementation would need to effectively leverage existing staff.
• Needed good value.
Anatomy of a Typical Energy Project

• Successful energy projects incorporate many facets – major differences from normal facility upgrades
• Proper identification and scoping
• Surveys, measurements, savings calculated
• Constant and consistent project (re)qualification
• Initial findings written up with calculations and initial project estimating
Anatomy of a Typical Energy Project (cont...)

• In most cases there is more than one solution to solving a deficiency
Anatomy of a Typical Energy Project (cont...)

• If the preliminary steps look promising then sink more time and money into development
• When these look good then onto final design and engineering, submission of documents to authorities
• Conduct bidding and receive bids, descope, value engineer
Anatomy of a Typical Energy Project (cont...)

• Coordinate with the end customers regarding service disruptions to their spaces during the project
• Review all shop drawings and manage the construction work on a daily, even hourly basis, including night shifts
• Review invoicing and perform project accounting
• Manage or perform measurement and verification to ensure savings are being realized and write up findings
• Chase down the operating and maintenance documents from contractors prior to closing out the project
Anatomy of a Typical Energy Project (cont...)

• And all the other steps that need to be managed
• Temple of course has strict procurement rules through legal and purchasing departments
• So in light of this context we can evaluate the pluses and minuses of the different contract vehicles
Contract Vehicles Available

• For Temple, the overall available contracting vehicle choices could be any of the following:
  • In-house engineering and installation labor
  • Bid and spec
  • ESCO project using ESPC/Performance Contract/GESA
  • EPCM, specialized Energy Projects Construction Manager also known at other institutions as a “Design-Build Energy Services Program”

Considered: In-House Design Engineering and Labor

- Temple has a project delivery group (PDG) so why not utilize the skills of those staff?
- PDG could manage bidding, project management and project accounting
- Still project scoping, surveys, calcs, specs
- So still a lot of work for the (then) understaffed Energy Office
- PDG was busy, already operating with full project loads

Acronym decoder: PDG=Project Delivery Group
Considered: Bid and Specification Procurements

• Most of Temple’s large projects are bid and spec so why not?

• Some of the bid and spec challenges:
  • Limited internal engineering and project management resources
  • Recurring issues – scoping, surveys, calcs
  • Each contract has to go through purchasing and legal and those groups have their own staffing constraints
  • And there’s project accounting all the way through, too
Considered: Bid and Specification Procurements (Cont...)

• Some of the good in bid and spec...
  • Institution is 100% in control
  • Institution gets the project you and your engineers design
  • Bid everything, so theoretically the efficient market always gives you best pricing
  • Or you can let a few large prime contracts and hope to get qualified subs and work
Considered: Bid and Specification Procurements (Cont...)

• Temple would have had to hire additional in-house resources to scope projects and manage the external engineers and the internal processes
• In the end bid and spec was not deemed practical for Temple’s desired rapid pace of investment
Considered: An ESCO Performance Contract?

• The ESPC Good:
  • No financial outlay for the host facility
  • Limited personnel commitment in developing projects
  • Guaranteed energy savings potential with M&V
  • The facility can unload some risk to the contractor
  • Price certainty of the developed projects
  • ESPC/GESA will likely satisfy competitive bid requirements

Considered: An ESCO Performance Contract? (Cont...)

• The ESPC not so good:
  • Multiple companies engaged in competitive bid cycle
  • Limited ability to stage Energy Conservation Measures
  • Project needs a good blended payback
  • Limited complexity of projects
  • You will never really know what markups you are paying

Considered: An ESCO Performance Contract? (Cont...)

• Industry experience says ESCOs try to “sell it at 20%, build it at 30%”

• Performance risk is still largely borne by the facility

• The decision taken at Temple was that an ESPC was not a great fit

Utilized: An Energy Projects Construction Manager – an EPCM

• Specially written, focused energy efficiency contract vehicle released in 2014

• Also known at other institutions as an Energy Savings Program Design-Build Contractor

• Satisfied Temple’s bid requirements with a single procurement

• Competitively bid margins and hourly fees

Acronym reminder: EPCM – Energy Projects Construction Manager
Utilized: An Energy Projects Construction Manager – an EPCM (Cont...)

- Outside engineers narrowed the list of prospective projects
- Five potential projects gave a way to gauge contractor approaches and meet their people
- Gave university open book pricing, agreed upon fees and markups
- EPCM contractor bids out each project and we see the results

Acronym reminder: EPCM – Energy Projects Construction Manager
Why this route to savings? The EPCM Model Used at Temple

• The selected route provided fast time to implementation – with other benefits that we’ll cover next

Acronym reminder: EPCM – Energy Projects Construction Manager
Why this route to savings? The EPCM Model Used at Temple

• Competitive selection:
  • Qualifications step reduced the field to three firms
  • They bid on a menu of predetermined ECMs (Energy Conservation Measures)
  • Each firm agreed to open books, agreed to show billing rates, agreed to fixed, disclosed margins
  • They bid each project and we see the bids
  • They have specialized energy engineers, construction managers and back-office support all focused on energy savings projects

Acronym reminder: EPCM – Energy Projects Construction Manager
Why this route to savings? The EPCM Model Used at Temple (Cont…)

• Projects were done with in-house funding
• Each project stood alone, no pressure to implement all as a package
• At peak Temple was spending probably 2.5 to 3 full-time employee days per week on managing this contract – significant

Acronym reminder: EPCM – Energy Projects Construction Manager
Why this route to savings? The EPCM Model Used at Temple (Cont...)

• Successfully implemented $11 million of varied projects over 3.5 years

• Temple controlled the implementation carefully

• Kept strict control of the timelines and procedures for:
  • Surveying
  • Engineering and Calculations
  • Permitting
  • Implementation – Scheduling
  • Finances

Acronym reminder: EPCM – Energy Projects Construction Manager
Which Route May Be Best for You?

• Use of external finance could affect project staging
• This EPCM-type design/build vehicle most likely suits customers who have internal engineering, project management and dedicated accounting personnel
• Due to a la carte options there are many, many decision points = management time

Which Route May Be Best for You? (Cont…)

• Assuming suitable projects are available then consider:
  • Funding – budget or borrow?
  • Savings – who will produce these?
  • Bidding – either the ESPC or EPCM route allows a single, intensive bid process (at least it did for Temple)
  • Project management meetings – someone has to be watching

Which Route May Be Best for You? (Cont…)

• There is no one-size-fits-all – Internal capabilities, funding, staff levels

• Some facilities will be best with a single ESCO project – simpler to administer but at some cost

• Others with a full complement of engineers and PM staff might find bid and spec works well

Which Route May Be Best for You? (Cont…)

• The ESPC and EPCM are both rapid, the ESPC would be more hands-off

• The open book nature of the EPCM deal created a partnership feel, we see all pricing and documents

• Bid and spec or internal implementations would work well if improvements are part of normal upgrade cycles

• At the end of the day, the facility owns it so someone needs hands-on

Results in Round Numbers

• Approximately $11 million invested since 2015. Of that total:
  • Over $8 million went to materials and subcontractors (we see the invoices)
  • Over $600,000 to design and engineering fees
  • About $2.5 million to other fees and services such as contractor markup, construction management, start-up and commissioning, M&V, rebate applications

• Verified about $1.8 million annual savings over multiple campuses

• Some sample projects follow
Project: Lab Exhaust VFDs at Medical School

8@75 HP, 5@60 HP = 900 HP of VFDs and sophisticated modulation and staging controls, $500,000 net investment with $136,000 savings
Project: Insulating Blankets Multiple Buildings

Removable blanket insulation, and steam traps approx $1.75 million invested, 6.0 year payback
Project: Reduce Simultaneous Heating and Cooling

Air handler improvements to reduce preheat use included these freeze protection pumps on chilled water coils. $900,000 investment, $200,000 annual savings.
Wrap-Up

Acknowledgements and thanks

Questions?