Redstone Arsenal - TVA UESC Case Study
Mark D. Smith, P.E., C.E.M.
U.S. Army Garrison-Redstone

Hosted by:

FEMP
Federal Energy Management Program

TVA
Thank You!

FEMP
Federal Energy Management Program

TVA
Redstone Arsenal

Overview
- 38,162 Acres
- 13,000 Developable Acres
- 1,774 Buildings (19M sq ft)
- 78 Tenant Organizations

Major Redstone Career Fields Supporting Redstone Arsenal
- Science and Engineering
- Logistics Management
- Acquisition & Contracting

− $18B Total Annual Economic Impact
− 104,500 Total Jobs Across Tennessee Valley

40,500+ Total Employees
- 17,500 Civilians (43%)
- 800 Military (2%)
- 22,200 Contractors (55%)

~ 40K Direct Jobs on RSA
~ 66.5K Indirect & Induced Jobs Across Region
Over 1,200 RSA Employees live in Tennessee
Approximately 500 live in Fayetteville
RSA Energy Strategy

**Competition Forces...**
- **Security**
- **Cost**
- **Sustainability**

**How we’re getting there...**

**Efficiency:**
- Energy Source Selection (TVA UESC Steam Pruning)
- Facility and Installation Energy Demand Reduction (Facility Energy Audits)

**Controls:**
- Facility & Utility Level Metering
- Bldg Controls & Monitoring Systems
- Utility Switching Capability

**Production:**
- Increase Secure & Renewable Energy
- Budget Neutral Requirement

**Current Energy Sources**
- Electricity
- Steam
- Nat Gas
FY 17 Redstone Arsenal Total Energy

Cost:
- 5% Natural Gas
- 32% Steam
- 63% Electricity

Total Cost $49.7M

Consumption:
- 20% Natural Gas
- 18% Steam
- 62% Electricity

Total Consumption 2,335,216 MMBTU
The Department of Energy has suggested that our steam distribution system loses about 35%, as a minimum, just from the pipe being heated.

Redstone Arsenal Energy Loss

- 100 BTUs Input
- 65 BTUs Usable Heat
- 35 BTUs Loss To Atmosphere

$ $ $
Utility Energy Service Contract (TVA)
Utility Energy Service Contract (TVA)

Goal
• Increase efficiency & reduce energy demand and cost

Scope to Date
• Switching from steam to natural gas or other feasible alternative source
• Lighting retrofits
• Building automation controls and metering
• Mechanical system replacement
• Building envelope improvements

D.O. #1 Meter Group A (37 Bldgs)
• Cost $9.8 million
• Annual savings $1.4 million
• Payback 7 years
• Construction complete FEB 2010
• Loan closed SEP 2014

D.O. #2 Meter Group B (28 Bldgs)
• Cost $14.7 million
• Annual savings $2 million
• Payback 7 years
• Construction complete FY14
• Loan closed NOV 2015

D.O. #3 North Loop 1 (27 Bldgs)
• Cost $9.6 million
• Annual savings $1.4 million
• Payback 7.1 years
Utility Energy Service Contract (TVA)

The geothermal bore field is located in grassy area between the 3200 block of buildings
Utility Energy Service Contract (TVA)
System Design - Bore field

- 168 vertical bores
- 200 feet deep
- Heat exchange pipe loops in each bore.
- This system is estimated to use 1/3 of the Btu’s per sq. ft. of the average building on RSA.
- It will provide both heating and cooling for the 19 surrounding buildings.
Utility Energy Service Contract – Way Ahead

D.O. # North Loop 2 (19 Bldgs)
- Cost $6.9 million
- Annual savings $941 K
- Payback 7.4 years
- Design and submittal phase

North Loop 3 & 4 Detailed Energy Study (29 Bldgs)
- 3 - Currently In Review
- 4 - Currently in Development

Sparkman Data Center – PNNL study
Redstone Technical Test Center
McMorrow Lab Bldg. 5400 Relook
Projects from DPW Annual Work Plan
A Successful Process – Reality

THERE ARE NO SECRETS TO SUCCESS
IT IS THE RESULT OF PREPARATION,
HARD WORK,
AND LEARNING
FROM FAILURE

- Colin Powell -
A Successful Process - Procurement

✓ Understanding of the needs and goals
✓ Develop a mutually desirable Basic Ordering Agreement (BOA)
✓ Audit plan for Detailed Energy Study (DES)
✓ Thorough proposal evaluation
✓ Thorough delivery order
✓ Thorough competition
✓ Joint contractor evaluation
A Successful Process – Quality

✓ Performance Assurance Plan IAW DOE guidelines
✓ Commissioning Agent
✓ Quality Assurance Evaluator – ASQ CQI
✓ Measurement and Verification - 1 year
✓ Preventative Maintenance – 1 to 3 years
✓ Thorough design/submittal review
✓ Detailed project schedule – Minimizes impact to cost/missions
✓ Designer approved changes
✓ Designer construction oversight / inspection
A Successful Process – Relationships

- Project Liaison
- On-site construction project manager
- Weekly progress/update meetings
- Coordination w/Base Planning and Engineering
- Coordination w/Base O & M
A Successful Process – Benefits

- Extension for engineering support
- Option to pay off early
- Low interest financing
- Demand reduction – for both parties
- Helps stretch appropriated funds

- Capital improvements
- ECM bundling
- Payment is line item on the utility bill
- Supports local economy/job creation
- Helps meet mandates
A Successful Process – Tips to Avoid Pitfalls

✓ Insure Appropriate Approval Thresholds
✓ Education on the UESC process => Buy-in
  • Leadership
  • Resource Management
  • Contract Personnel
  • O & M Personnel => Performance Assurance
    ➢ Warranty
    ➢ Preventative Maintenance
✓ Same engineer for audit and design => Consistency
✓ Communicate, communicate, communicate!
A Successful Process – Results

Factors Beyond the Formula

- Installation Population
- Mission Requirements
- Facility & System Efficiencies
A Successful Process – The Team

TVA
Gary Harris, Vice President, Industrial Marketing & Services
Mary Jane Owens, Manager, Industrial Accounts
Daryl Williams, Manager, Industrial Services
Brent Powell, Sr. Program Manager, Federal Energy Services Program
Peyton Butler, Attorney, Office of General Counsel
Kaye Murphey, Business Support Representative
Ashley Thrasher, Contracts Manager, Supply Chain
Tim Campbell, Program Manager, Industrial Services
Andrew Harris, Program Manager, Power Customer Contracts
Rick Penter, Project Manager
Ron Westmoreland, Project Manager
Randy Summers, Project Manager

RSA
Joe Davis, Director, Directorate of Public Works
Craig Northridge, Chief, Master Planning Division
Mary Dotson, Chief, Military Construction Branch, MP
Mark Smith, Energy Manager, MP
Patrick Holmes, Energy Manager, MP
Tim Smith, Base Operations
Pete Green, Base Operations
Beverly Love, Contract Officer, Army Contracting Command
Portia Sampson, Contract Specialist, ACC
Genevia Fontenot, Attorney Advisor

Contract Support
Bruce Fisackerly, Advanced Energy Consultants, Inc.
Robert Staples, Johnson Contractors, Inc.
Lee Palmer, Allen & Hoshall, Inc.
Richard Crowe, REA, Inc.
Donnie Allen, General Manager, CCI Group
Jeff Thrower, QAE, CCI Group
Mark Hardiman, System Admin, CCI Group
Merlon Largen, Project Liaison, CCI Group
Chris Hester, Wolf Creek, Base Maintenance
Questions?