



An Energy Efficiency Workshop & Exposition
Palm Springs, California

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and
Set pagers to vibrate**



An Energy Efficiency Workshop & Exposition
Palm Springs, California

Digging in to New Construction

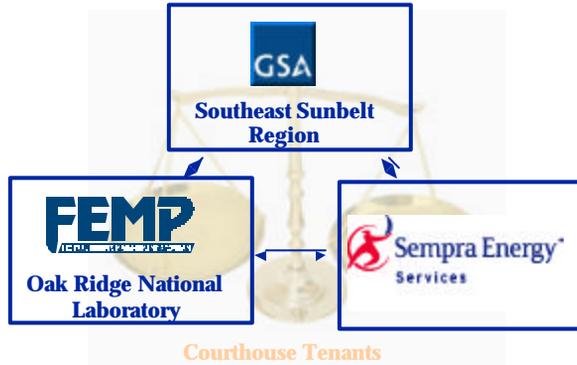
**Gulfport
Courthouse**

June 5, 2002





Partnership



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3



Intent

Showcase use of Alternative Financing to improve energy efficiency of Federal new construction project

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4



Mission

- Introduce General Concepts re: Energy Savings Performance Contracting application in new construction scenario
- Relate specific concepts applied to Gulfport Courthouse project

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5



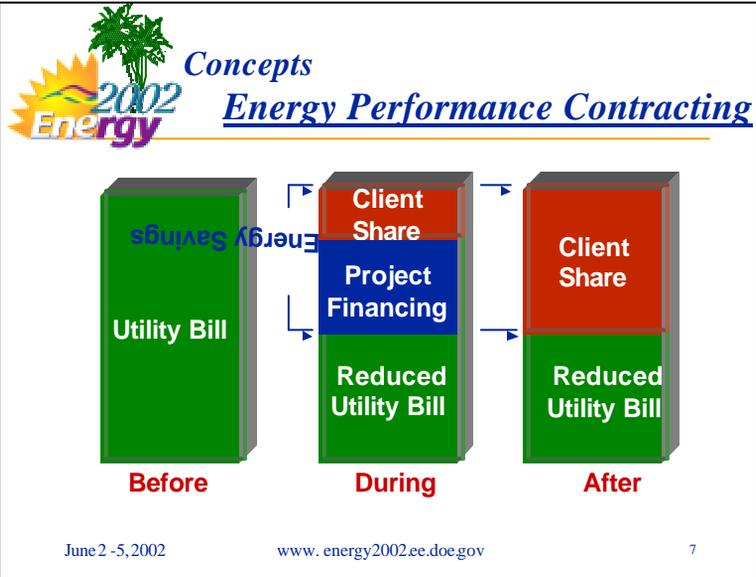
Concepts The Need

- Capital Budget Challenges
 - Limited Funding
 - Lengthy Approval Process
 - Functional Scope Creep
 - Energy Item Vulnerability
- Enhance Energy Performance of newly constructed buildings

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6



-  **Concepts**
GSA Role
- Deliver Quality project on time, within budget
 - Satisfy Customer expectations
 - Coordinate myriad contracts and criteria that impact project completion and performance
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Concepts FEMP Role

- Facilitate interaction between GSA & ESCO
- Balance needs of parties (especially in terms of risk)
- Gain consensus on approach (esp. DOE & Agency Contracting Officer buy-in)



Concepts ESCO Role (possibilities)

- **Financing Agent for ECM Savings**
- **Install subset of ECMs**
 - **Construct discrete, energy-related Scope of Work**
 - **Subcontractor (Mech, Elec, and/or Cntls) for entire building**
 - **General Contractor for entire building**

Implementation



Concepts

ESCO Role (possibilities)

- **Warranty only**
- **Operate and/or maintain ECMs installed by ESCO**
 - **Operate and/or maintain all ESPC ECMs**
 - **Full building operation and maintenance**

Operations and Maintenance

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11



Concepts

Savings Identification

- Model baseline condition
- Value engineer design from energy standpoint
- Model energy efficient design

*Energy \$_{base} - Energy \$_{eff} = Level of
Alternative Financing Available*

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12



Concepts Baseline Development

- Current design for new building
- ASHRAE 90.1 standards
- Energy performance of current location
- Typical, recent experience of GSA
- Combination of above

Whatever is agreeable; needs to withstand audit!



Concepts Design Interface

- When is it appropriate to get ESCO involved?
- How do you handle ESCO involvement prior to ESPC Delivery Order award?
- How do ESCO-recommended design changes make their way into final design of building?

 Federal Courthouse, Gulfport, MS



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15

 Gulfport Courthouse

- New eight-story tower
- Historic preservation/reuse of 1920's – vintage high school
- Stand-alone service building that supports campus (chillers, boilers, emergency generator)
- Approximately 220,000 SF total
- Construction Cost: \$ 45 Million

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16



Gulfport Courthouse Construction Timeline

- General Contractor Selected: Sep 00
- Notice to Proceed to GC: Aug 01
- Scheduled Completion: Aug 03
- Beneficial Occupancy: Oct 03



Gulfport Courthouse ESPC Development Timeline

- Unofficial Notification of Selection: Feb 00
- Initial Proposal Submitted: Nov 00
- Notice of Intent to Award D.O.: Feb 01
- Final Proposal Submitted: May 01
- Delivery Order Awarded: Sep 01



Gulfport Courthouse Development Methodology

- 1) Determine Baseline
- 2) Analyze ECMs/Value Engineer
- 3) Identify incremental costs/savings
- 4) Aggregate Savings
- 5) Apply savings to identifiable feature

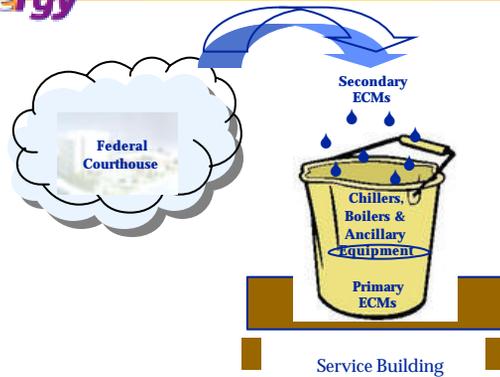
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19



Gulfport Courthouse Aggregate Savings



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20



Gulfport Courthouse ESPC Savings Make-up

- Annual Savings
 - Energy Savings
 - O & M Savings
- One-time Ancillary Cost Savings/Cost Avoidance

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21



Gulfport Courthouse Energy Savings

□ Glazing Upgrades	\$10.2K
□ Lighting Upgrades	\$16.5K
□ Lower ChW Coil Static Pressure	\$ 8.1K
□ VFDs on Air Handling Units	\$ 8.3K
□ VFDs on ChW & HW Pumps, CT Fans	\$ 4.9K
□ Increased Chiller Eff., Plant D T	\$13.0K
□ Occupancy Controlled Ventilation	\$10.0K
□ Cooling Tower Water Meter	\$ 5.9K
□ Single Electrical Service Meter	\$ 5.9K
Total Energy Savings	\$83.7K

Orange ➢ Primary ECMs ~ Blue ➢ Secondary ECMs

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22



Gulfport Courthouse Operations & Maintenance

- Full building O & M
(i.e., not just O & M on ECMs)
- Normal GSA approach: Base + 4 option years
- As originally proposed: 15 years
- As awarded: 17 years

*~ \$40K annual savings (Year 1) – \$88K cost incurred
prior to start of performance period*

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23



Gulfport Courthouse One-time Ancillary Savings/Cost Avoidance

- Deleted Secondary ChW & HW Pumps
- Reduced Capacity, Changed to Inclined-tube Boilers
- Reduced Size of Distribution Piping to Buildings
- Electrical & Controls Revised
- Reduced Service Building Footprint

Total: \$320K

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24



Gulfport Courthouse *ESPC Financials*

- Capital Investment: \$1.6 Million
- Annual Energy Savings: \$ 84 Thousand
- Annual O & M Savings: \$ 40 Thousand
- Cost Avoidance (annualized): \$ 37 Thousand

- Amount Financed: \$1.9 Million
(17 years @ 8.4%)

Note: Annual savings figures represent Year 1 values

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25



Gulfport Courthouse *Development Coordination*

- Iterative review of potential ECM baseline and savings prior to submission of Initial Proposal
- Bi-weekly conference calls (GSA, DOE/FEMP, Sempra) during preparation of final Proposal
- Preliminary negotiations/general price agreement w/courthouse mechanical & electrical subs after design completion
- Final negotiations on ESPC conducted after those with GC on courthouse construction

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26



Gulfport Courthouse Measurement & Verification

- Baseline determination
- Define reasonable post-installation configuration
- Identify appropriate Monitoring and Verification (M&V) processes
- Conduct M&V activities after construction
- Provide annual reports and verification results

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27



Gulfport Courthouse Measurement & Verification

ECMs Description	IPMVP Option	Baseline M&V	Post-Retrofit M&V
Glazing Upgrade	NB-A-01	Single-Pane (laminated), Clear, Uncoated	Agreed to Baseline & Savings Based on Engineering Calculation & Simulation Results
Lighting Modifications and Fixture Upgrade	NB-C-01	1.4 W/sf for Courthouse	Agreed to Baseline & Savings Based on Engineering Calculation. Reduced after Case Lighting Density of 1.09 W/sf. Verify equipment is properly maintained.
High Efficiency Chiller Plant	NB-C-01	Chillers with 0.68 kW/ton	Continuous Measured Electrical Consumption.
VFDs on AHUs, Secondary Chilled Water and Hot Water Pumps, and Cooling Tower Fans	NB-C-01	Constant Speed Motors with Estimated Baseline kW	

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28



Gulfport Courthouse Measurement & Verification

ECMs Description	IPMVP Option	Baseline M&V	Post-Retrofit M&V
AHU and Cooling Coil Upgrade	NB-A-01	4.75" Static Pressure at Cooling Coils	Agreed-to Savings Based on Engineering Calculation and Simulation Results
Modified Central Plant Chilled Water (up to 14) and Condenser Water (up to 12) Delta T	NB-A-01	Chilled Water Delta T= 10, Condenser Water Delta T = 10	
Occupancy Controlled Ventilation	NB-A-01	No Occupancy Control Ventilation	
Reduce Cooling Tower Water Consumption	NB-A-01	Constant Volume Bleed off, No Side Filtration, No Waste Water Credit	

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29



Gulfport Courthouse ESPC Implementation Timeline

- Construction Kick-off Meeting: March 02
- Begin Physical Construction: Apr 02
- Construction of ECMs Complete: Aug 02
- Ability to Deliver Chilled/Hot Water: Sep 02
- Begin Performance Period: Oct 03

Notes: 1) Construction originally slated to begin Mar 02

2) Equipment procurement took place Oct 01 -Apr 02

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30



Gulfport Courthouse Financing Challenge

- Lock financing at Delivery Order Award (8.4%)
- Reinvest financed amount (2%)
- Commence construction draw 6 months after DO award
- Complete construction draw 12 months after DO award
- Begin receipt of payments from GSA 25 months after DO award

Impact on financing: nearly \$300K

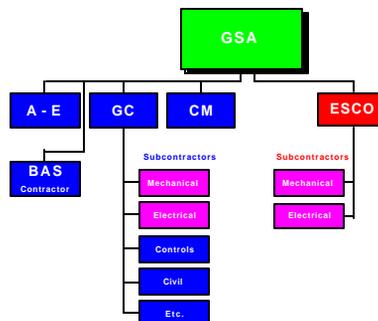
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31



Gulfport Courthouse Contracting Relationship



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32



Gulfport Courthouse Practical Considerations

- Safety Program
- QA/QC Procedures
- Scheduling
- Site Coordination
- Commissioning

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33



Gulfport Courthouse Other Considerations

- GC and ESCO selection criteria – Respective strategies for working together?
- Design – When should ESCO get involved? To what extent? Treatment prior to D.O. award?
- Partnering efforts – Integrate ESCO into process during project development?

Cost – Benefit Trade-offs

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34



*Gulfport Courthouse
Beyond the Conceptual*



Early April 2002

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35



*Gulfport Courthouse
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Late April 2002

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36



Gulfport Courthouse Benefits

- Reduced first-cost to GSA
- Reduced recurring costs to GSA
- More energy efficient campus
- Fixed accountability for systems performance

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37



Gulfport Courthouse Points of Contact

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38