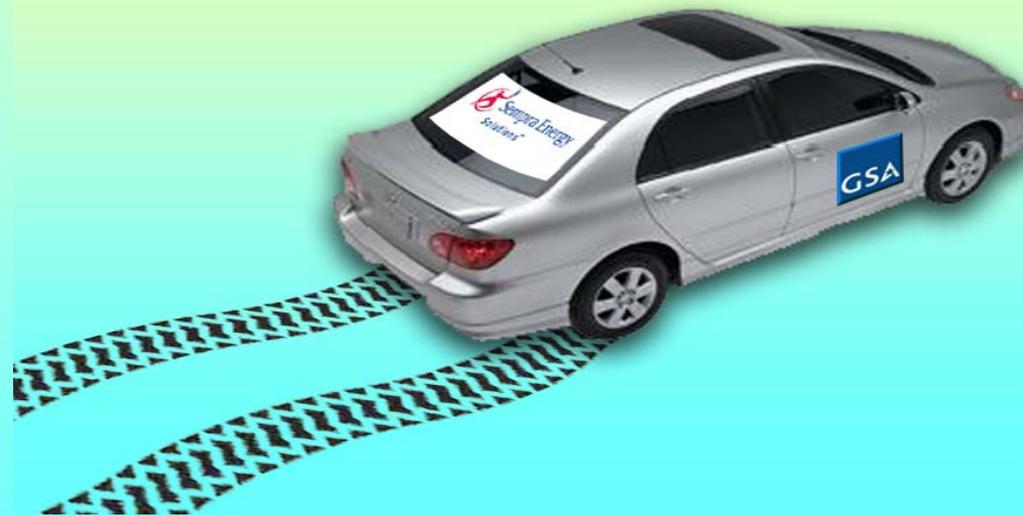


Energy **2003** *An Energy-Efficiency Workshop and Exposition*
Orlando, Florida

CHP for FDA's new White Oak Campus



in the Fast Lane !



Partnership



August 17-20, 2003

www.energy2003.ee.doe.gov



Intent

Demonstrate use of Alternative Financing to integrate Combined Heating & Power into a Federal new construction project



Mission

- Introduce General Concepts re: Energy Savings Performance Contracting and CHP application in new construction scenario
- Relate specific concepts applied to Federal Research Center at White Oak project



Concepts *The Need*

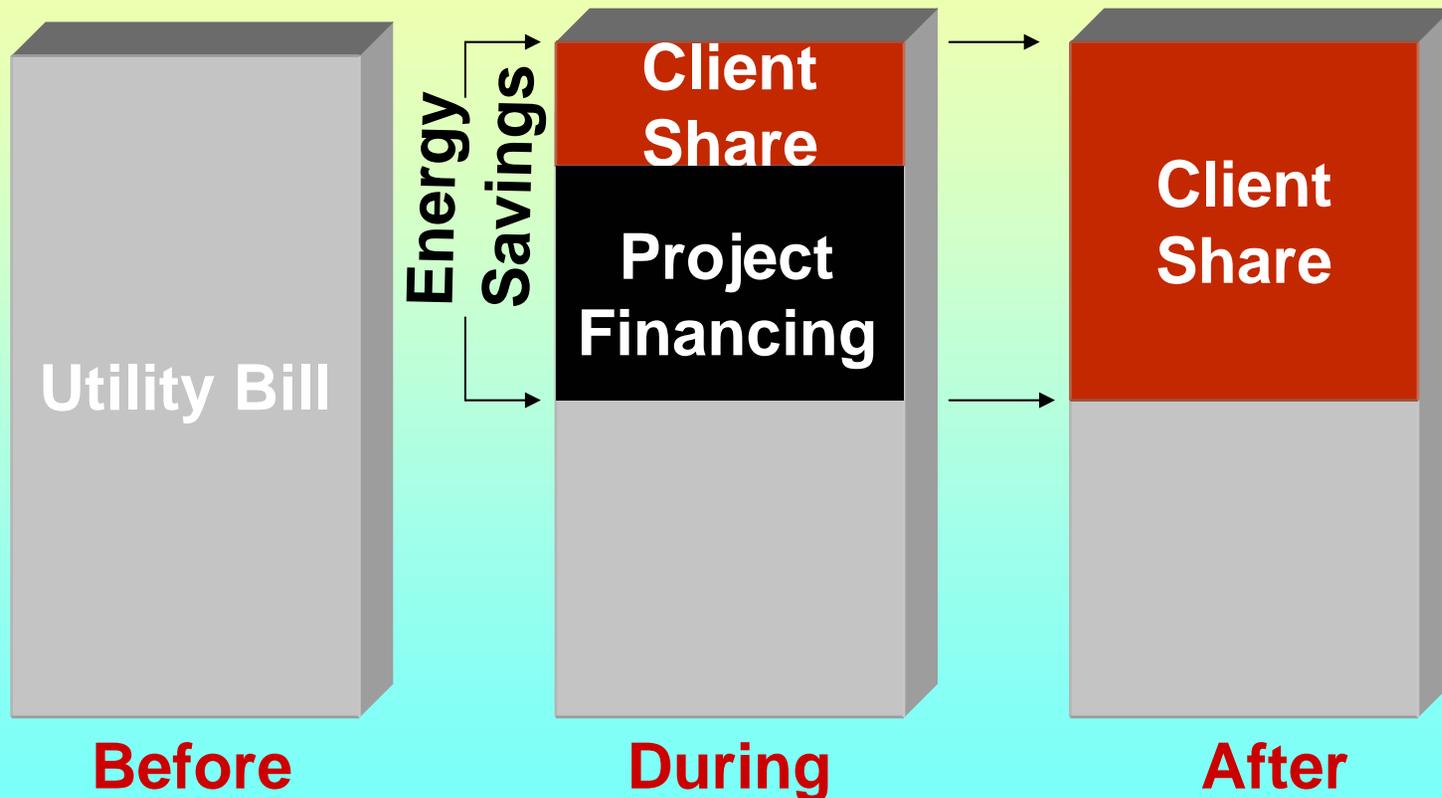
- Capital Budget Challenges
 - Limited Funding
 - Lengthy Approval Process
 - Functional Scope Creep
 - Energy Item Vulnerability
- Enhance Energy Performance of newly constructed buildings

**Congressional
Appropriations**



Concepts

Energy Performance Contracting



Savings achieved via introduction of various Energy Conservation Measures (ECMs)



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*



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!



U.S. Department of Health and Human Services

Food and Drug Administration



**Federal Research Center
White Oak**

Silver Spring, Maryland

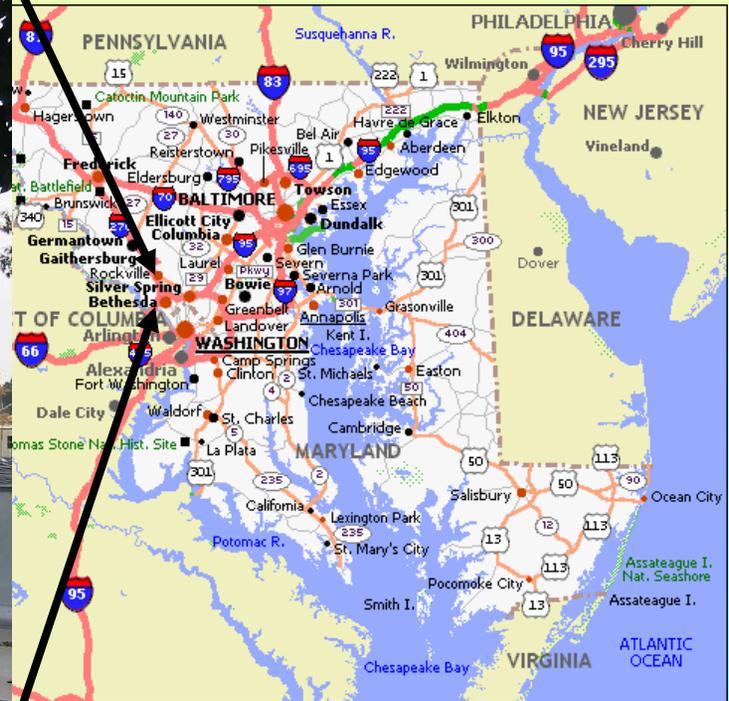
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FRC White Oak Project Location



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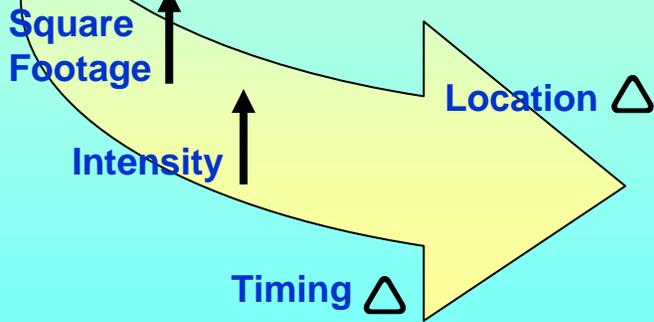
FRC White Oak

Revised Development Schedule

PHASE	BUILDING NAME/GROUP	GROSS SQ FT	OCCUPANCY DATE
1	CDER LAB	129,000	Oct-2003
2	CDER OFFICE	554,000	Jan-2005
3	SHARED USE (Phase 1)	122,000	Mar-2005
3	CDER OFFICE EXPANSION	367,000	Apr-2006
3	CDRH LAB	128,000	Sep-2006
3	CDRH OFFICE	373,000	Dec-2006
3	LOGISTICS Bldg	141,000	Apr-2006
3	DAY CARE	21,000	Dec-2005
4	SHARED USE (Phase 2)	61,000	Jan-2007
4	CBER LABS	303,000	Nov-2008
4	CBER LAB EXPANSION	75,000	Mar-2008
4	CBER OFFICE	133,000	Nov-2007
4	CBER OFFICE EXPANSION	105,000	Apr-2008
5	BUILDING ONE Renovation	90,000	Jan-2007
5	OC & ORA	357,000	Nov-2008
6	CVM OFFICE	123,000	Nov-2009
Build-out		3,082,000	



FRC White Oak Site Development



Dynamic Program !



FOOD AND DRUG ADMINISTRATION CONSOLIDATION
WHITE OAK, MD
WHITE OAK DEVELOPMENT PLAN

GENERAL SERVICES ADMINISTRATION
MAY 2003
Kling **STVL**



FRC White Oak *Project Features*

- Combined Heating and Power for White Oak Campus
- Energy Conservation Measures....includes Photovoltaic element
- Cost Avoidance/One-time Ancillary Savings
- Sempra-provided Operations & Maintenance Services



FRC White Oak

Total Savings Make-up

- One Time Ancillary Savings
 - Avoided demolition costs
 - Avoided construction costs
 - Avoided temporary heating and cooling costs
- Annual Savings
 - Energy savings
 - O&M savings



FRC White Oak *Project Financials*

- **Capital Cost** **\$27.5M**
- **Annual Energy Savings** **\$ 1.4M**
- **Annual O&M Savings (net, 3rd year value)** **\$ 1.1M**
- **Total Annual Savings (net)** **\$ 2.5M**
- **Simple Payback 6.7 Years**
- **Capital Cost Available from Savings** **\$28.7M**
– 20 years @ 8.1%
- **Required Construction Cost Savings** **\$ 0**
(including avoided demolition)



FRC White Oak

Energy Conservation Measure Savings

•Photovoltaic	\$ 2,842
•Central Plant Improvements (CHP)	\$ 1,040,000
•Lighting Upgrade	\$ 41,849
•Glazing Upgrade	\$ 54,800
•AHU Redesign	\$ 158,011
•VFD on Pumps	\$ 46,757
•Economizer Cycle	\$ 18,443
•Demand Controlled Ventilation	\$ 18,783
•Night Setback	\$ 42,914
Total Energy Savings	\$ 1,424,400



FRC White Oak

Combined Heating & Power System

- Baseline:
 - Pepco GT 3A Primary Rate, 2-500-ton and 2-1700-ton chillers
 - Constant speed motors on chilled water pumps, condenser water pumps, and cooling towers
 - Steam Heating
 - Chilled water ΔT of 12 °F and Condenser water ΔT of 10 °F
- Proposed:
 - Engine driven generator, 1 1130-ton absorption and 2 1130-ton electric chillers
 - Variable speed drives on all pumps and cooling towers
 - Hot Water Heating
 - Chilled water ΔT of 20 °F and Condenser water ΔT of 15 °F
- Savings: \$1,040,000 (annually, first year figure)
- Remarks: Electric Steam Boilers to be installed in buildings



FRC White Oak *Energy Security*

- 5.8 MW Engine-Generator
 - Dual Fuel
 - Primary Power Source
- Underground Electrical Distribution System
- Interconnection with Electric Grid
 - Two separate feeders into substation
- 2 MW Standby Diesel Generator



FRC White Oak Equipment Layout



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FRC White Oak *Optimization*

Initial Approach: Near-continuous operation of engine-generator

Current Strategy: Real-time “make or buy” decision based upon cost of natural gas, electric tariff, campus loads vs. engine & cogen efficiencies, etc.

Bottom Line: Sempra, GSA and tenants work in partnership to operate the facility in the best interests of the Government



FRC White Oak Permits, etc.

Air Quality

PSC → MDE:

Wartsila
Cummins

Boiler Permits

Interconnection Service Agreement

GSA/PJM/Pepco
Amend Pepco CoGen Tariff

Laboratory Certification

FDA:

AAALAC Accreditation

GSA Metropolitan Services Division

National Capital Planning Commission

Historic (HBPP)
Aesthetics
Noise

Water Quality

MDE:

Erosion/sediment control
UST Permit



FRC White Oak Non-ESPC Stuff

AF Campus

Substation Revitalization

Central Utilities
Plant



Campus Building
Commissioning



Consultant for Gas &
Electric Procurement



Historic Preservation
of old Firehouse



FDA Campus

Metropolitan Services
Division
&
Energy Center of Expertise

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FRC White Oak *Lessons Learned*

- ESPC training for key personnel early in process
- Greater level of design desirable in comparison to traditional ESPC during DES phase
- Management Reserve for unforeseen circumstances & procedures for use
- Develop notional utilities budget for facilities operation as part of DES
- Specify timeframe/vehicle for work outside ESPC scope



FRC White Oak

ESPC Development Timeline

- Concept proposed to GSA: Oct 01
- Initial proposal submitted: Jan 02
- Final proposal submitted: Mar 02
- Delivery Order awarded: Jul 02
- CUP Operational (minus CoGen): Oct 03
- Enter ESPC Performance Phase: Jan 04



FDR White Oak

ESPC Project Benefits

- Reduced first-cost to Government
- Reduced recurring costs to Government
- More energy efficient campus
- Fixed accountability for systems performance
- ***Enhanced Energy Security***



Questions ?

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