



Energy Management Future Imperative for Sustainable Development

Energy 2003

17-20 August 2003

Dr. Get W. Moy, P.E.
Director, Utilities and Energy Use
Office of the Under Secretary of Defense
(Installations and Environment)



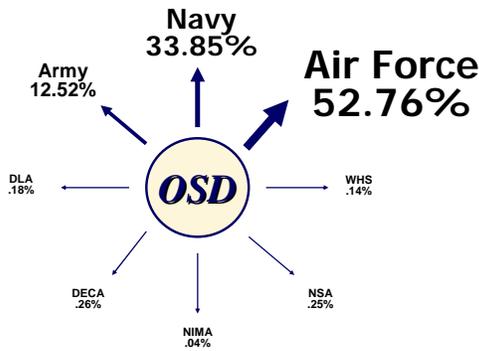
Perspectives

DoD Infrastructure

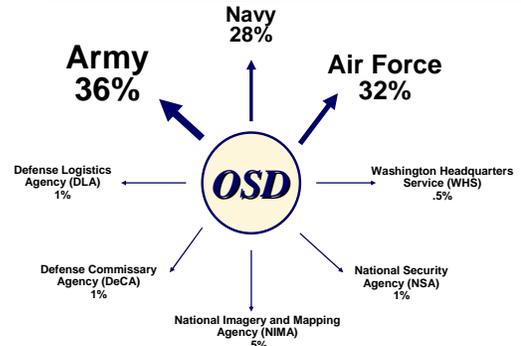
- ◆ Value **\$600 B**
- ◆ Buildings and structures **621,850**
- ◆ Square Miles **46,425**



Military Services and Defense Agencies (Total)



Military Services and Defense Agencies (Buildings)



DOD Statistics

Consumption \$ 6.8 B

	BTU % USED
◆ Vehicles/Ships	70%
◆ Buildings	25%
◆ Industrial	4%



30-40% of Energy Use and Atmospheric Emissions



35-40% of the Municipal Solid Waste Stream

- ◆ 150 million tons of construction and demolition waste
- ◆ 220 million tons for all other municipal solid waste



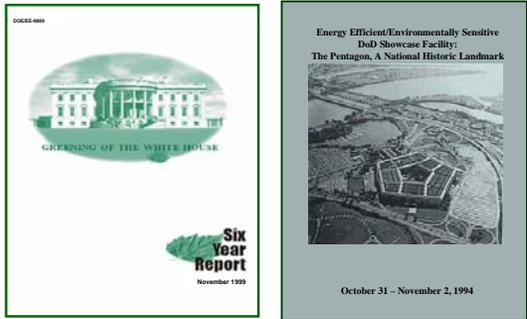
25-30% of Materials and Wood Use



Sustainable Design – The Beginning

- 1970s**
 - * First major legislation to address Federal energy management
 - * Reduction goals put in place
- 1980s**
 - * Congressional support intensifies
 - * Regulations allowed alternative funding (i.e. shared energy savings contracts)
 - * Implemented incentives for energy reduction
 - * Reduction goals intensify
 - * Environmental regulations imposed on Federal buildings
- 1990s**
 - * Performance goals for Federal buildings
 - * Extended reduction goals
 - * Sustainable design begins
 - * Pollution prevention becomes major issue

DoD Took Lead in Sustainable Development



Naval Facilities Engineering Command Sustainable Development Pilot Projects

PROJECT	Change in Est. Construct. Cost	Est. Annual Savings *	Pay Back
FY-96 P-002T \$19.9 mil Renovate Quadrangle Buildings Washington Navy Yard, DC	+ \$95,000	\$130,000	Less than 1 year
FY-96 P-247 \$ 4.1 mil Physical Fitness center MCB Camp Pendleton, CA	- \$180,000	\$6,300	Immediate Savings
FY-96 HCR-3-94 \$14.8 mil Whole House Renovations (450 units) NAVSTA Mayport, FL	+1000/unit	\$250/unit	Less than 5 years
FY-96A P-758 \$7.8 mil BEQ Mess Hall NSGA Sugar Grove, WV	- \$100,000	\$1,600	Immediate Savings
FY-94A P-488 \$9.0 mil BEQ NCBC, Port Hueneme, CA	- \$142,000	\$1,600	Immediate Savings
FY-97 H-321 \$34.6 mil 276 Housing Units NAS Lemoore, CA	No cost increase	\$44,000	Immediate Savings
FY-96A H-374 \$ 6.2 mil 23 Housing Units/Multi-Purpose Facility NSGA Sugar Grove, WV	Project withdrawn		
FY-97 P-626 \$60.1 mil BEQ, NTC Great Lakes, IL	- \$600,000	\$110,000	Immediate Savings
P-641			
P-646			

* Energy savings only. Maintenance, repair, and other savings not included.

18 Sep 1998

Guidance

**SUSTAINABLE PLANNING:
A Multi-Service Assessment 1999**

Department of Defense



New Age of Energy Security A Time for Transformation

Conclusions

- DoD - long step recognizing importance of U&E
- Crucial backbone
- Proactive
- Need your input / help / innovations
- To get to the next level with energy / energy security, we must do it together

Advantages

- Achieve through comprehensive energy strategy
 - Infrastructure modernization
 - Energy source flexibility
 - Energy waste reduction
- Proactive
 - Risks → Our management
 - Mission accomplishment

Challenges / Drawbacks

- New territory to explore
- More risky – from inexperience
- Requires investment

Summary

- Energy Reliability = Energy Security
- Energy Reliability supports Readiness
- We need your partnership

Plan/Proposal

- Modernize the infrastructure
- Invest in
 - Energy conservation
 - Energy efficiencies
 - Demand reductions
- Exploit flexible energy sources
- Focus on leadership / execution / results

Introduction

- Statistics
 - DoD infrastructure
 - DoD commodity costs
 - DoD size
- VP's study/report
- WIIFT
 - No longer just throwing our weight around – now demonstrating
 - Leadership
 - Execution
 - Results

Problem

- Old school
 - Manage consumption
 - Manage goals
 - React to industry
- Stovepipe treatment
- BUT
 - Will not lead us to the future
 - Will not leave us much of a legacy to enjoy
 - Will fall behind in transformation

Facts at Hand

- CA energy crisis
- Poor state of infrastructure
- Critical infrastructure
- Poor information management
- Energy source dependence

Utilities and Energy Management

Vision

100 %
reliability
of utility
services
to the
Warfighter

Utilities and Energy Management

Grand Challenges

Modernize Infrastructure

Increase utility and energy conservation and demand reduction

Improve energy flexibility

Mission

Ensure that the DoD utility infrastructure is secure, safe, reliable and efficient, that energy and water commodities are procured effectively and efficiently, and that the components maximize energy and water conservation efforts.

Vision

100 %
reliability
of utility
services
to the
Warfighter

DoD ENERGY POLICY Initiatives	Grand Challenges	Mission	Vision		
<p>Actions</p> <ul style="list-style-type: none"> • Issue guidance • Demonstrate benefit of program • High "stage of privatization" • Technology (better data) • Right people involved <p>Implement appropriate Distributive Energy Resources</p> <p>Embrace Sustainable Design</p> <ul style="list-style-type: none"> • LCC Analysis • W & B Design Guide <p>Enhance recognition</p> <ul style="list-style-type: none"> • Showcase facilities • Awards • Training <p>Establish metering policy</p> <ul style="list-style-type: none"> • Benchmarking • Accuracy in Accounting • Accrediting Energy Star Buildings <p>Promote renewable</p> <ul style="list-style-type: none"> • PRS • Self-generated <p>Pursue energy funding</p> <ul style="list-style-type: none"> • Designated Organizations • Private sector investments <p>Increase efficiency products use</p> <ul style="list-style-type: none"> • Energy Star • Alternative fuels 	<p>Strategies</p> <ul style="list-style-type: none"> • Align Services with working group/guidance • Ensure proficiency in carrying out program • Execute program efficiently and effectively <p>Implement conservation measures and reduce cost</p> <div style="border: 2px solid red; padding: 5px; text-align: center; font-weight: bold; color: red;">Achieve / increase energy awareness</div> <div style="border: 2px solid red; padding: 5px; text-align: center; font-weight: bold; color: red;">Expand use of renewable energy</div> <p>Ensure DoD standards</p> <p>Focus on going from utility privatization to utility management</p> <p>Improve Energy</p> <ul style="list-style-type: none"> • Efficiency • Development • Investment 	<p>Goals</p> <p>Successfully Complete utility privatization by 2005</p> <p>Bring all systems to C2 level</p> <p>Sound Stewardship in management of systems</p> <p>Reduce energy consumption</p> <p>Reduce greenhouse gases</p> <p>Expand use of renewable energy</p> <p>Improve energy flexibility</p>	<p>Grand Challenges</p> <p>Modernize Infrastructure</p> <p>Increase utility and energy conservation and demand reduction</p> <p>Improve energy flexibility</p>	<p>Mission</p> <p>Ensure that the DoD utility infrastructure is secure, safe, reliable and efficient, that energy and water commodities are procured effectively and efficiently, and that the components maximize energy and water conservation efforts.</p>	<p>Vision</p> <p>100 % reliability of utility services to the Warfighter</p>

Sustainable Development

- ◆ Energy consumption and atmospheric emissions
- ◆ Environmentally preferable products
- ◆ Life-cycle cost analysis
- ◆ Indoor air quality

Sustainable Design Costs Reasonable

- ◆ No additional first-cost
- ◆ Advanced energy efficiency for minimum investment
- ◆ Reduced site preparation & landscaping
- ◆ Lower construction waste costs
- ◆ Better design reduces change orders



Benefits of Sustainable Design

Reduced Operating Costs

- ◆ Lower Utility costs:
\$0.50-\$0.60 per square foot
vs. \$1.00-\$1.50
- ◆ Reduced maintenance costs

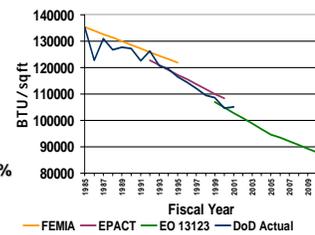


Energy Performance

DoD Reduction goals

- ◆ Building energy use per GSF down 35% from 1985 to 2010
- ◆ Industrial energy use per GSF down 25% from 1990 to 2010
- ◆ Cut greenhouse gas emissions by 30% from 1990 to 2010
- ◆ By FY01 DoD has reduced Building energy use by 23% since 1985
- ◆ By FY01 DoD has reduced Industrial energy use by 20% since 1990

Standard Facility Reduction Goals vs Actual Usage



OSD Statistics

Consumption \$ 6.8 B

	BTU% USED
Vehicles/Ships	70%
Buildings	25%
Industrial	4%

Goals

Building energy per GSF
 ↓ 30% by 2005; 35% by 2010
 Industrial / lab energy
 ↓ 20% by 2005; 25% by 2010

DoD Performance

25.4%
 24.5%

Performance Awards

Presidential DoD received 3 of 5 awards
 FEMP Awards DoD received 29 of 54 awards
 (Army 13; DON 12; AF 4)

By FY02 DoD had reduced building energy use by 25%, since 1985



Traditional Design

Typical planning and design process relies on the expertise of specialists who work somewhat isolated to focus on the program needs during the development of a building design.

- ◆ Linear process from architect to engineering consultants.
- ◆ Periodic design meetings to coordinate efforts.



Whole Building Design

A successful "Whole Buildings" design is a solution that is greater than the sum of its parts. The fundamental challenge of 'whole buildings' design is to understand that all building systems are interdependent.

- ◆ Looks at how materials, systems and products of a building connect and overlap.
- ◆ Looks at how the building and its systems can be integrated with supporting systems on its site and in its community.



Whole Building Design

- ◆ The fundamental challenge of 'whole buildings' design is to understand that all building systems are interdependent.
- ◆ Through a systematic analysis of these interdependencies, a much more efficient and cost-effective building can be produced.



Whole Building Design Guide

WBDG

<http://www.wbdg.org>

Your Complete
Internet Resource to
Building Related
Design Guidance,
Criteria, and
Technology

