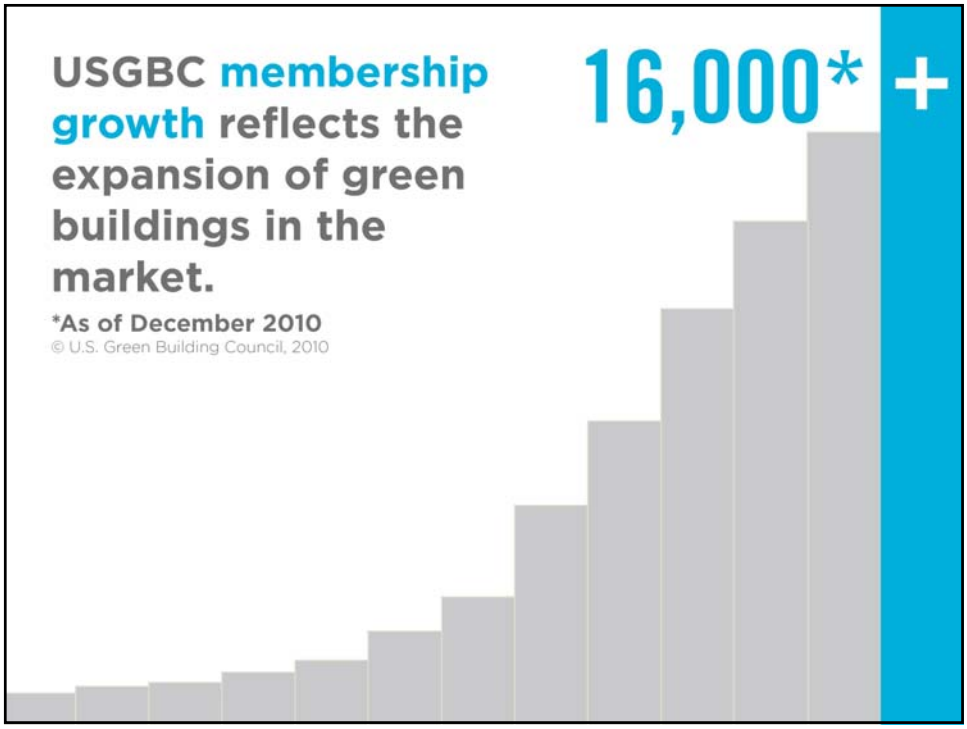
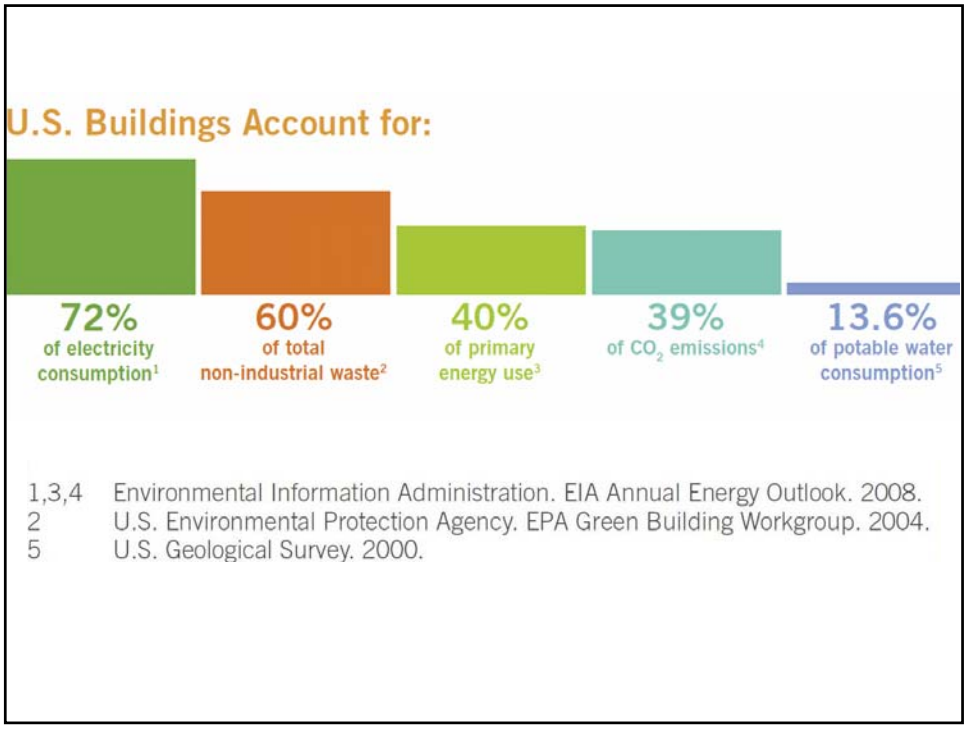
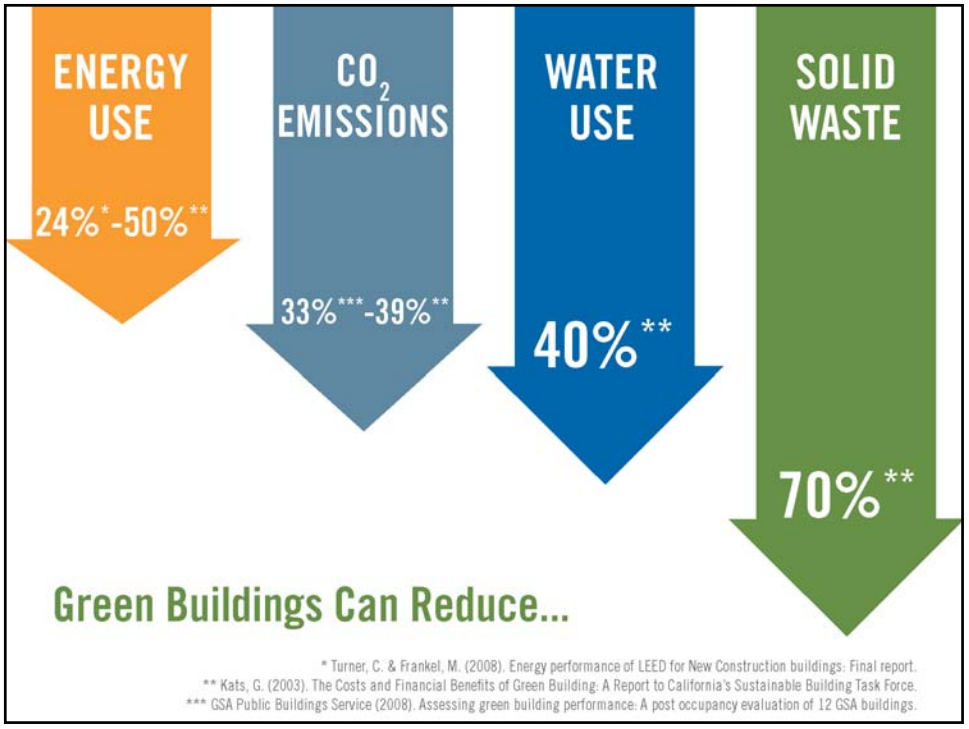
# Sustainable Buildings for National Security

Jason Hartke
**Vice President of National Policy**
**U.S. Green Building Council**
**jhartke@usgbc.org**

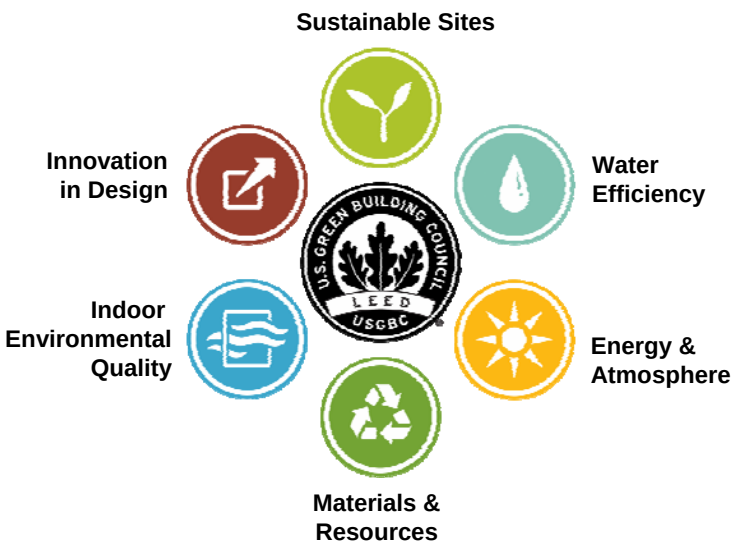
**ACCO's Climate Change Leadership Series**
Defense, National Security and Climate Change: Mitigating Risks and Seizing Opportunities in a Rapidly Changing Global Environment



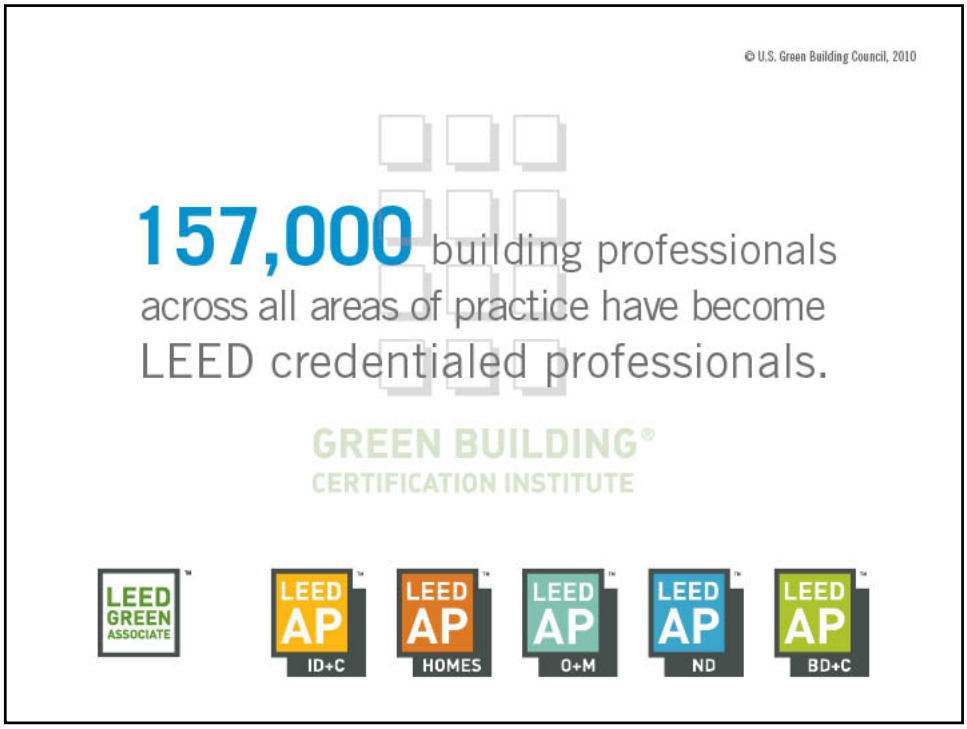

U.S. Buildings Account for:
72%
of electricity consumption[1]
60%
of total non-industrial waste[2]
40%
of primary energy use[3]
39%
of $CO_2$ emissions[4]
13.6%
of potable water consumption[5]
1,3,4 Environmental Information Administration. EIA Annual Energy Outlook. 2008.
2 U.S. Environmental Protection Agency. EPA Green Building Workgroup. 2004.
5 U.S. Geological Survey. 2000.

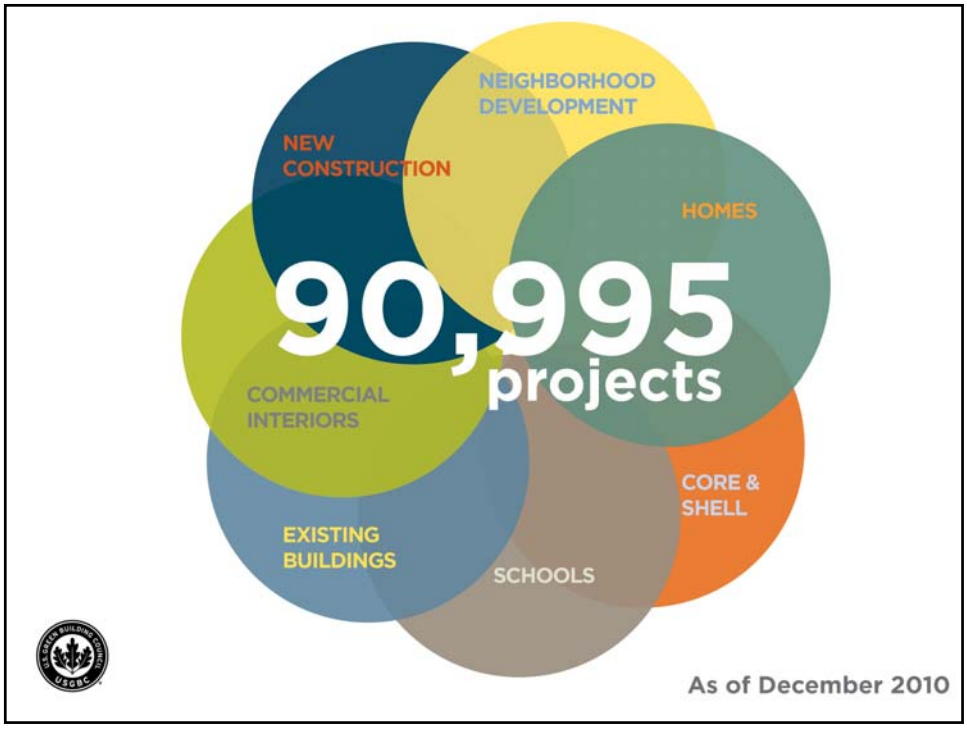

ENERGY USE
24%*-50%**
$CO_2$ EMISSIONS
33%***-39%**
WATER USE
40%**
SOLID WASTE
70%**
Green Buildings Can Reduce...
* Turner, C. & Frankel, M. (2008). Energy performance of LEED for New Construction buildings: Final report.
** Kats, G. (2003). The Costs and Financial Benefits of Green Building: A Report to California's Sustainable Building Task Force.
*** GSA Public Buildings Service (2008). Assessing green building performance: A post occupancy evaluation of 12 GSA buildings.

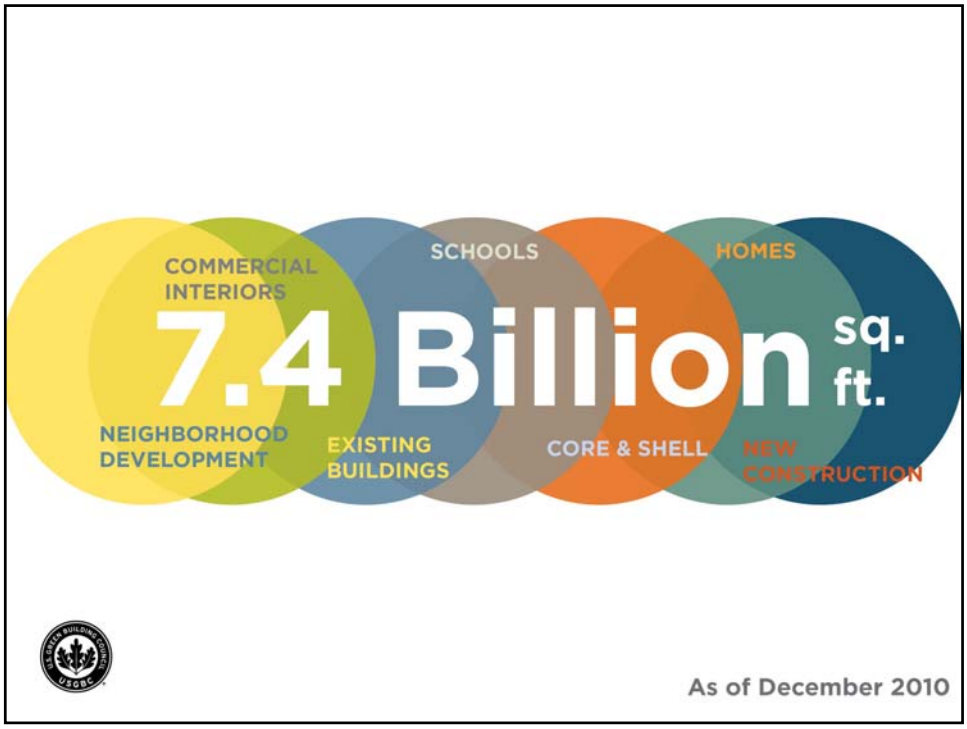
# Organization of LEED




## LEED ADDRESSES THE COMPLETE LIFE CYCLE OF BUILDINGS


© U.S. Green Building Council, 2010
157,000 building professionals across all areas of practice have become LEED credentialed professionals.
GREEN BUILDING®
CERTIFICATION INSTITUTE
LEED GREEN ASSOCIATE
LEED AP ID+C
LEED AP HOMES
LEED AP O+M
LEED AP ND
LEED AP BD+C

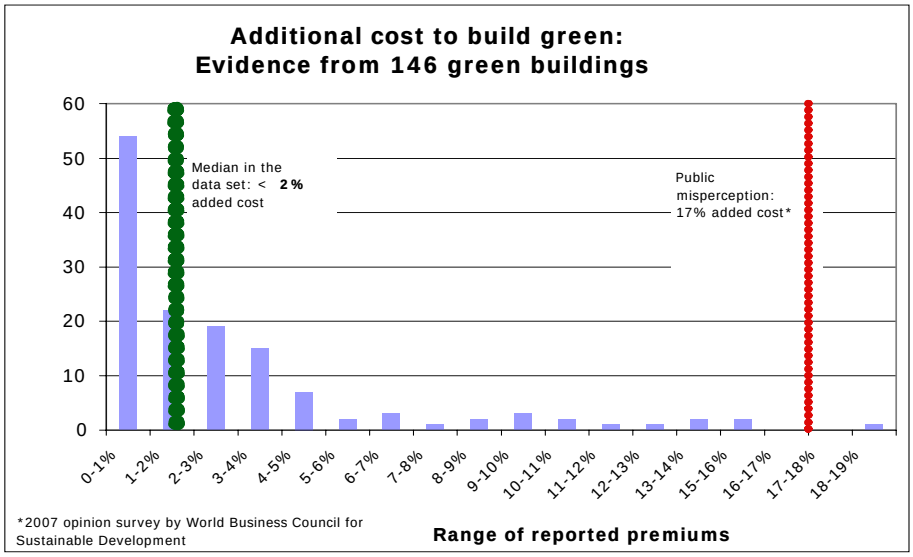

NEIGHBORHOOD DEVELOPMENT
NEW CONSTRUCTION
HOMES
90,995 projects
COMMERCIAL INTERIORS
CORE & SHELL
EXISTING BUILDINGS
SCHOOLS
As of December 2010



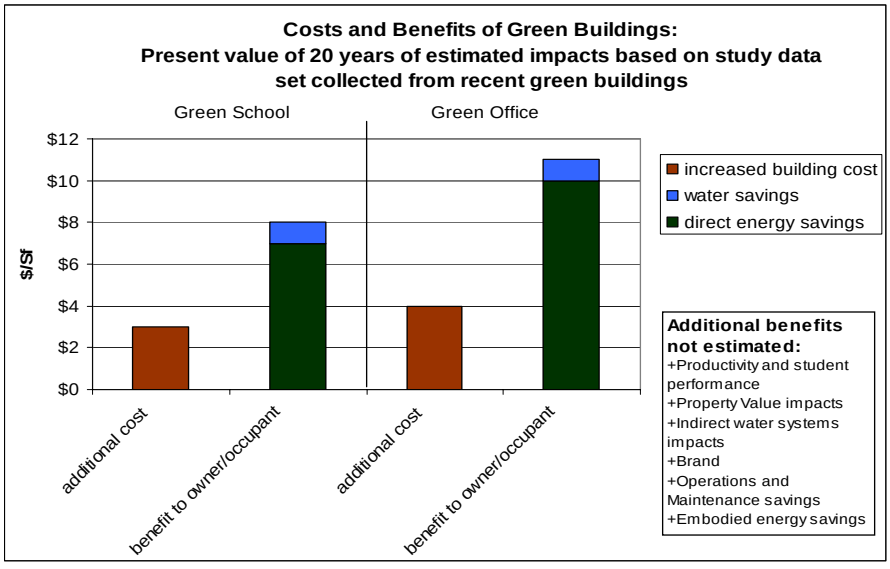

# Federal Sustainability Mandates

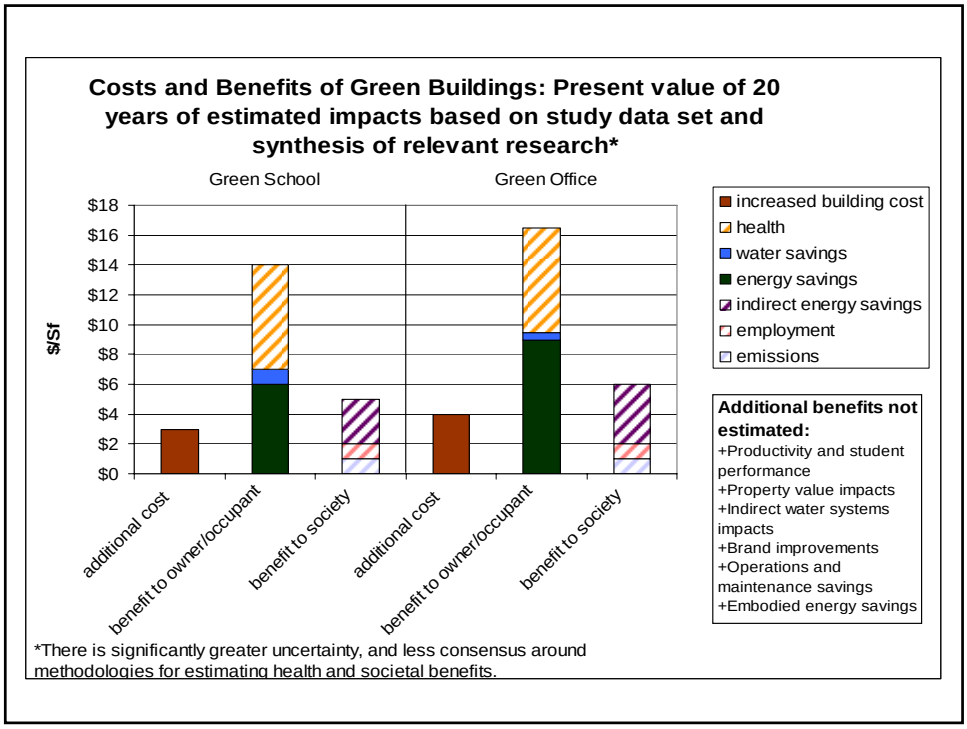
- **2005 Energy Policy Act**
- **2007 Energy Independence and Security Act**
- **2007 EO 13423** - Strengthening Federal Environmental, Energy and Transportation Management
- **2009 EO13514** - Federal Leadership In Environmental, Energy, and Economic Performance
- **2010 DoD Greenhouse Gas Targets Announcement**: ***34% reduction in GHG emissions***

# Cost of building green




# Costs and benefits




Costs and Benefits of Green Buildings: Present value of 20 years of estimated impacts based on study data set and synthesis of relevant research*
Green School
Green Office
$/Sf
$18
$16
$14
$12
$10
$8
$6
$4
$2
$0
additional cost
benefit to owner/occupant
benefit to society
additional cost
benefit to owner/occupant
benefit to society
increased building cost
health
water savings
energy savings
indirect energy savings
employment
emissions
Additional benefits not estimated:
+Productivity and student performance
+Property value impacts
+Indirect water systems impacts
+Brand improvements
+Operations and maintenance savings
+Embodied energy savings
*There is significantly greater uncertainty, and less consensus around methodologies for estimating health and societal benefits.


Government accounts for about 1/3 of all LEED Projects
The Federal government registered 1798 LEED projects in 2009 alone!


# Department of Defense

Leadership by Example:

- 104 Certified; 11 mil s.f.
- 2,085 Registered; 247 mil s.f.
- NC & MR at LEED Silver
- FY12: min of 40% energy and water credits

**LEADERSHIP**

Department of the Army

- 39 LEED Certified; 4.6 million s.f.
- 1404 LEED Registered; 184 million s.f.
- LEED Silver Requirement

Department of the Navy

- 46 LEED Certified; 3.2 million s.f.
- 479 LEED Registered; 32 million s.f.
- LEED Silver requirement

Air Force

- 10 LEED Certified; 250,000 s.f.
- 184 LEED Registered; 4.5 million s.f.
- LEED requirement

*The Community Hospital at Ft. Belvoir*

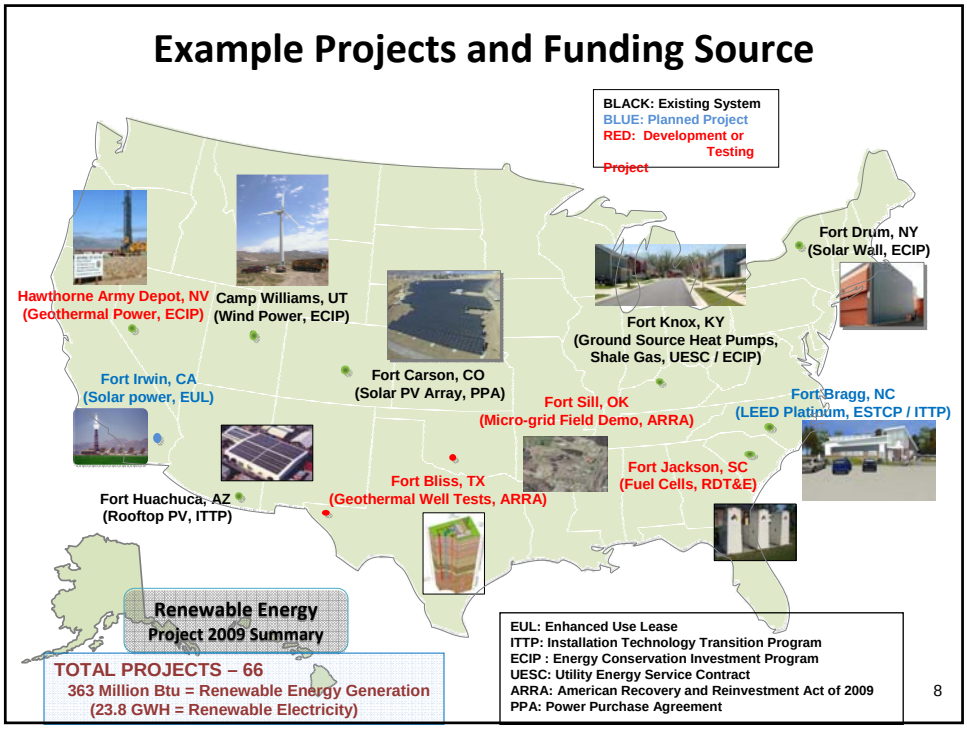
**Tracking LEED SILVER**

- Expected energy savings: 27.6% below ASHRAE standards
- 62% of the 45 acre site restored with native vegetation
- Rain water collection system *(roof swoops, below grade cistern, visible drainage system)*
- Green roofs and courtyard gardens
- Low-E and Low VOC materials, products, and furniture throughout
- LEED and EBD integration

*The Replacement Hospital At Ft. Riley*

**Tracking LEED SILVER**

- Expected energy savings: 17% below ASHRAE standards
- Central Energy Plant Design *(heat recovery chillers)*
- Energy Saving Engineering Strategy *(variable speed drive premium efficiency motors and fans, airside economizers on AHU, and direct digital control systems)*
- Energy Saving Lighting Strategy *(LED lighting in corridors, minimal incandescent use, occupancy sensors, and exterior lighting with photocell and time clock operation)*
- Enhanced building envelope design
- Tracking all IAQ LEED credits

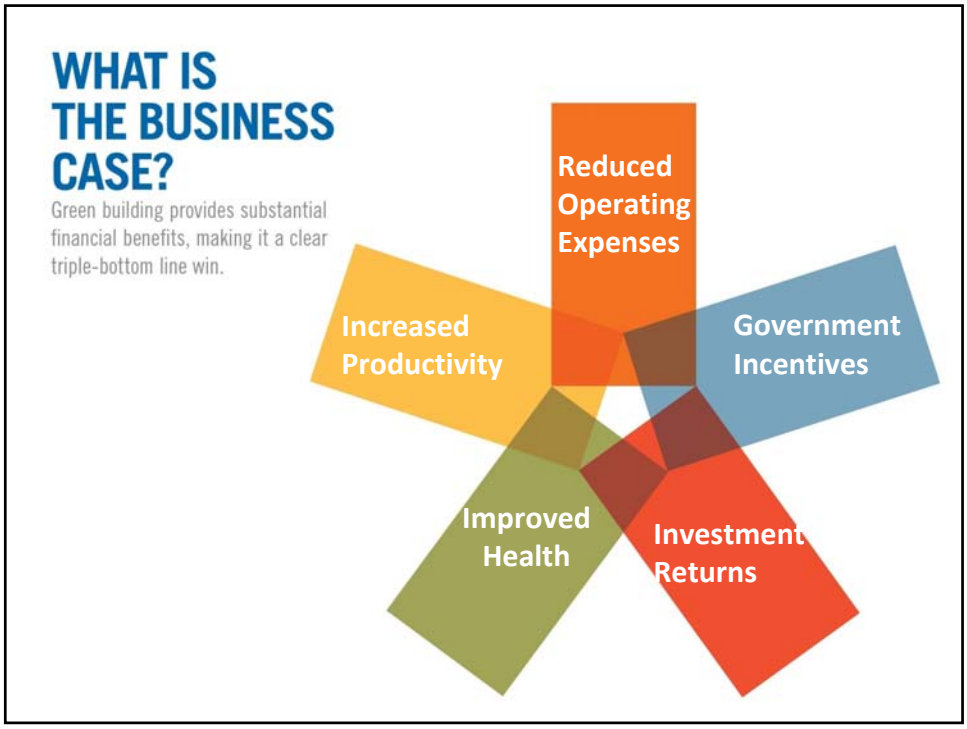


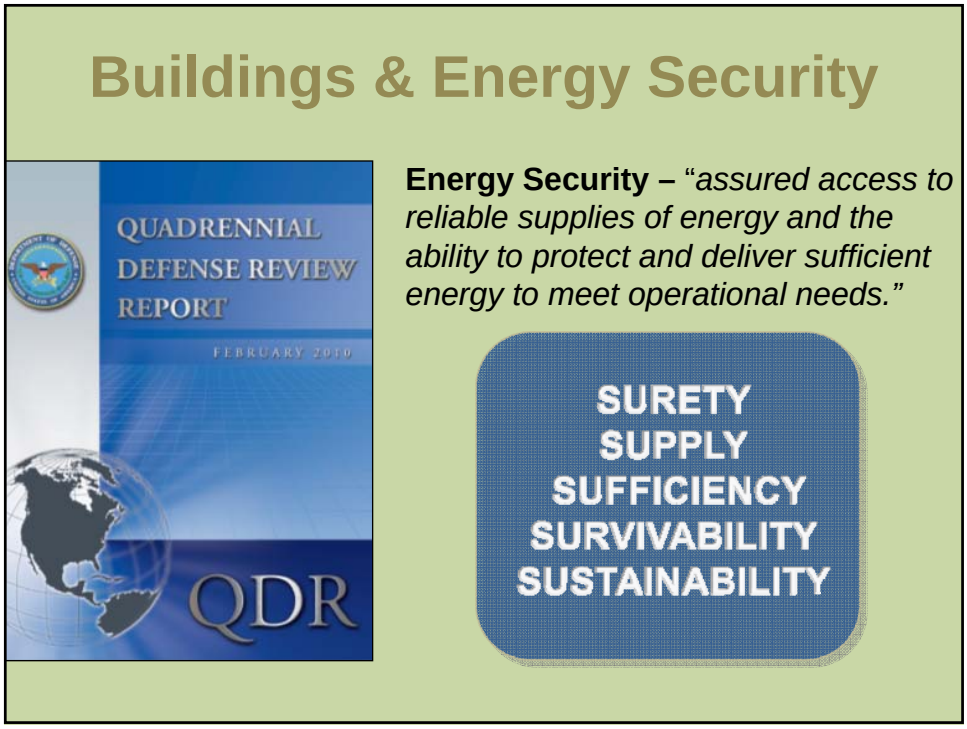

# Wounded Warrior Barracks at Camp Pendleton

## (LEED Platinum)

Sustainable achievements in energy, water and waste:

- 38% in energy savings
- Nearly 40% in water savings in the building
- 66% water efficiency in the landscaping
- 86.5% of the waste generated on site (878 tons) was diverted from local landfills.


WHAT IS THE BUSINESS CASE?
Green building provides substantial financial benefits, making it a clear triple-bottom line win.
Reduced Operating Expenses
Increased Productivity
Government Incentives
Improved Health
Investment Returns


Buildings & Energy Security
QUADRENNIAL DEFENSE REVIEW REPORT
FEBRUARY 2010
QDR
Energy Security – "assured access to reliable supplies of energy and the ability to protect and deliver sufficient energy to meet operational needs."
SURETY
SUPPLY
SUFFICIENCY
SURVIVABILITY
SUSTAINABILITY

# Answering the Security Question

"Energy Security and Sustainability are Inextricably and Synergistically Linked"
*– L. Jerry Hansen, Army Assistant Secretary of Installations*

"A Strategic Imperative" *– Admiral Mike Mullen, chairman of the Joint Chiefs of Staff, on the importance of the U.S. military becoming more efficient and energy independent*

# Accounting for Warmer Temperatures

- Avoid increasing cooling-load
- Landscaping to minimize cooling requirements
- Planning for (new) Pest management
- Natural ventilation
- High-efficiency lighting & equipment
- Increase cooling design temperatures

## Accounting for Drought and Water Shortages

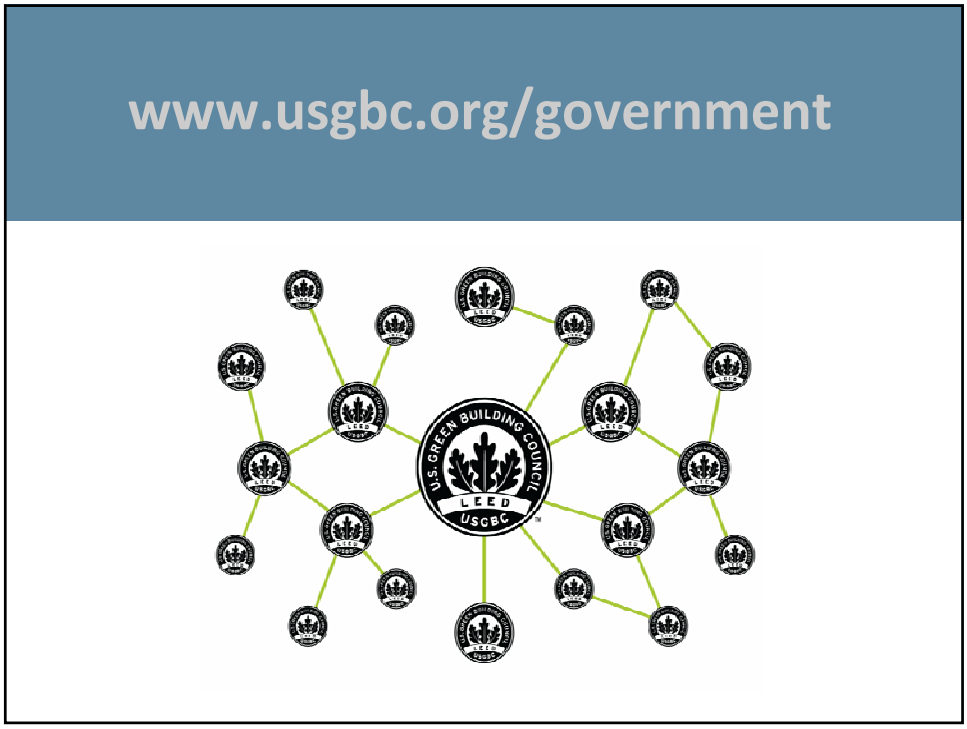
- Water-efficient fixtures and appliances
- Water-conserving fixtures; Plumb for graywater separation
- Rainwater harvesting
- Native vegetation

## Accounting for Stronger Storms and Flooding

- Planning, designing and engineering for extreme wind
- Avoiding flood zones, which are getting bigger
- Adjusting for greater stormwater capacity
- Raising buildings and equipment

# Accounting for Energy Disruptions?

- Site-generated, renewable electricity
- Net-zero energy buildings
- Advancing "Passive Survivability"
- Solar hot water
- Utilizing equipment with emergency operability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WWW.USGBC.ORG/GOVSUMMIT
GREEN BUILDING HAS THE POTENTIAL TO
ADD $554 BILLION TO THE U.S. GDP,
SAVE OR CREATE 7.9 MILLION JOBS,
CONTRIBUTE $396 BILLION IN WAGES,
AND SAVE $6 BILLION IN ENERGY
OVER THE COURSE OF FOUR YEARS.


QUESTIONS