



Department of Defense A Catalyst to Commercialization

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Office of the Under Secretary of Defense for Installations and Environment

Report Documentation Page

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Key Points

Acquisition, Technology and Logistics

- DoD is committed to using resources in a more sustainable manner...Why?
- DoD High Performance Buildings policy offers flexibility while insisting on life-cycle cost effectiveness
- DoD is ready to be an early adopter and catalyst for commercialization of sustainable technologies

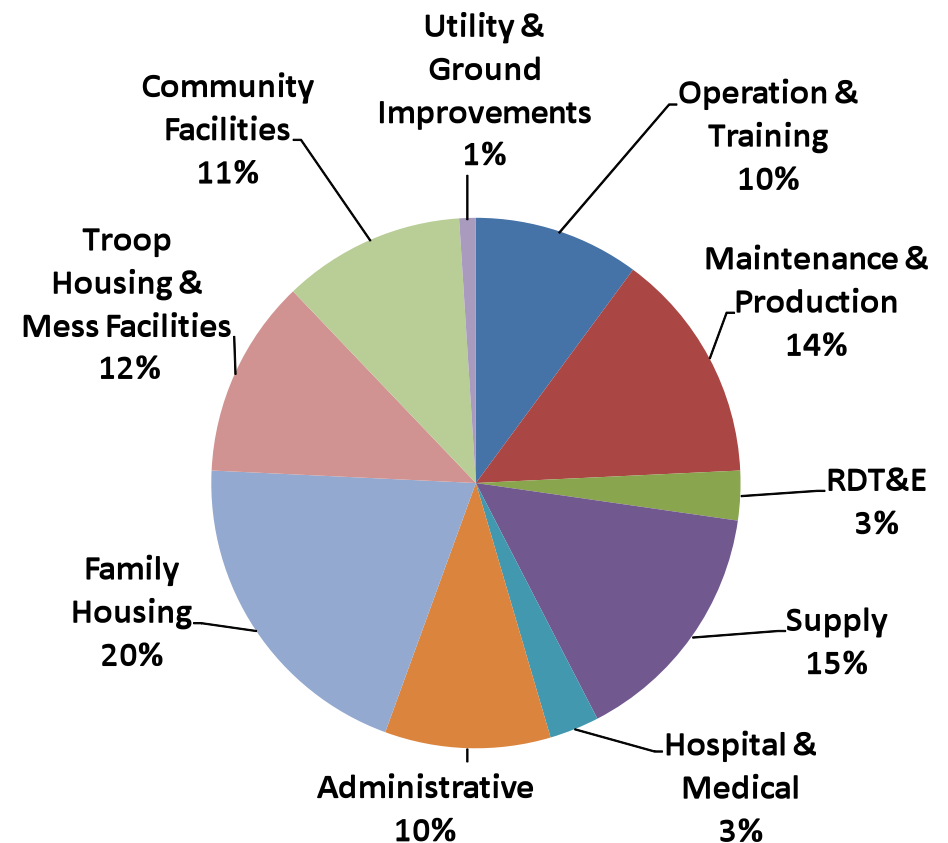


DoD: BIG and Diverse

Acquisition, Technology and Logistics

- 307,295 buildings
 - 2.2 billion square feet
- Comparisons
 - GSA: 1,500 government buildings
 - 176 million square feet
 - Wal-Mart US: 4,200 buildings
 - 687 million square feet
- 160,000 Fleet Vehicles

DoD Building Stock





Sustainability: More than a Buzzword

Acquisition, Technology and Logistics

- Using Resources Sustainably Offers Key Military Advantages
 - Friendly forces are less vulnerable
 - Less "tail" = More "tooth"
 - Reduced pressure on key resources may reduce odds of future conflict





DoD Policy: Flexible, Yet Focused

Acquisition, Technology and Logistics

- All major building construction: LEED Silver (or equal)
- 40% of LEED score from energy & water reduction
- Compliance with Guiding Principles
- Life-cycle cost effective





Forward Momentum

Acquisition, Technology and Logistics

210 LEED Certified Facilities



New Construction



Major Renovation



Variety

Hangar, Ft Smith - LEED Silver



BEQ, Bremmerton - LEED Silver



Brigade HQ, Ft Carson - LEED Gold



C-17 Hangar, Travis AFB, CA - LEED Silver





BIG: Challenge and Opportunity

Acquisition, Technology and Logistics

- Challenge
 - BIG portfolio plus declining budget
 - Implication: “Greening” the portfolio building-by-building will take a long time
- Opportunity
 - Variety of building types
 - Covering all climate zones
 - Installations like small cities
 - Implication:
 - Think outside the “box”
 - Test new technologies



Installation Energy Test Bed

Acquisition, Technology and Logistics

- Emerging technologies hold great promise, but face major impediments to commercialization and deployment
 - Building industry is highly fragmented
 - First user bears significant costs
 - A&E firms face liabilities but do not share in savings
 - Lack of operational testing deters potential adopters
 - DoD is uniquely positioned to help overcome these barriers
 - It is in DoD's self interest given the size of our inventory (Wal-Mart has its own energy test bed but it is limited to big-box stores)
 - DoD's built infrastructure is unique for its size and variety— it captures the diversity of building types and climates in U.S.
 - Military has 150 years of experience as a sophisticated first user of new technology and an early, market-creating customer (jet engines, aircraft, integrated circuits, GPS, internet)



Installation Energy Test Bed

Acquisition, Technology and Logistics

- Use DoD Facilities as Test Bed for Innovative Energy Technologies
 - Validate performance, cost, and environmental impacts
 - Transfer lessons learned, design and procurement information across all Services and installations
 - Directly reach out to private sector for innovations
 - Leverage DOE investments
- Develop, Test & Evaluate for All DoD Facilities
 - Advanced components to improve building energy efficiency
 - Advanced building energy management and control
 - Smart microgrid and energy storage to improve energy security
 - Tools and processes for design, assessment and decision-making for energy use and management
 - Renewable energy generation on DoD installations



Building Integrated PV

Acquisition, Technology and Logistics

DESCRIPTION

- Validate whether BIPV roofs can endure weather conditions as well as conventional roofs
 - Luke AFB, MCAS Yuma, NAS Patuxent
- Verify whether a roof integrated solar photovoltaic system can perform as a cost effective energy efficient roof
- Promote adoption of BIPV roof technology within DoD through the Unified Facilities Guide Specification (UFGS)



BENEFITS/METRICS

- Demonstrations will document energy savings, costs, reliability and applicability to DoD roofs
- Effectively low cost per Watt installed

PERFORMERS

- NAVFAC ESC
- Lawrence Berkeley National Laboratory
- ERDC- CERL
- SEI Group, Inc



Continuous Building Commissioning

Acquisition, Technology and Logistics

DESCRIPTION

Objectives are to demonstrate whole-building modeling and monitoring systems capable of:

- 1) identifying, classifying, and quantifying energy and water consumption deviations from design intent or optimal,
- 2) identifying the causes of those deviations, and
- 3) recommending, prioritizing, and implementing corrective actions.

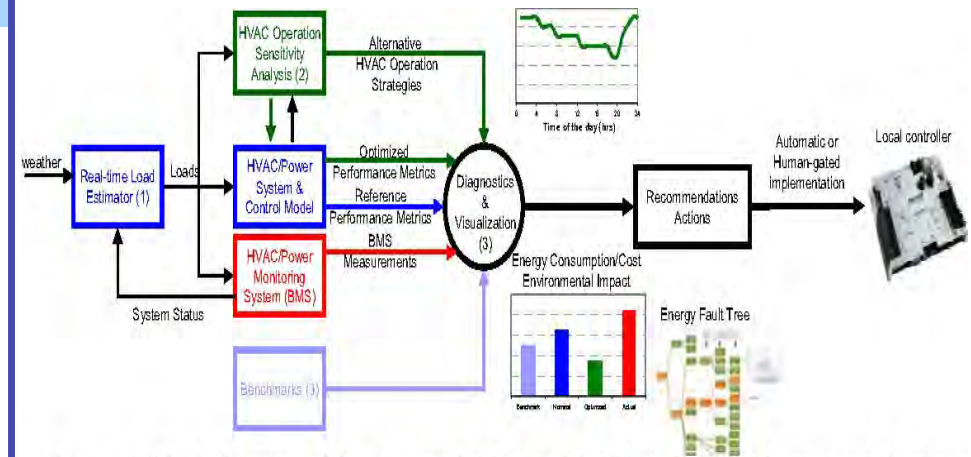


Figure 1. Block diagram of the proposed Advanced Building Energy Management Systems

BENEFITS/METRICS

- Demonstrations will document energy savings, costs, reliability and applicability to DoD buildings.
- Successful implementation of this technology will enable reduced energy consumption, peak electric demand, and water use in DoD buildings by providing actionable information to facility managers and building operators.

PERFORMERS

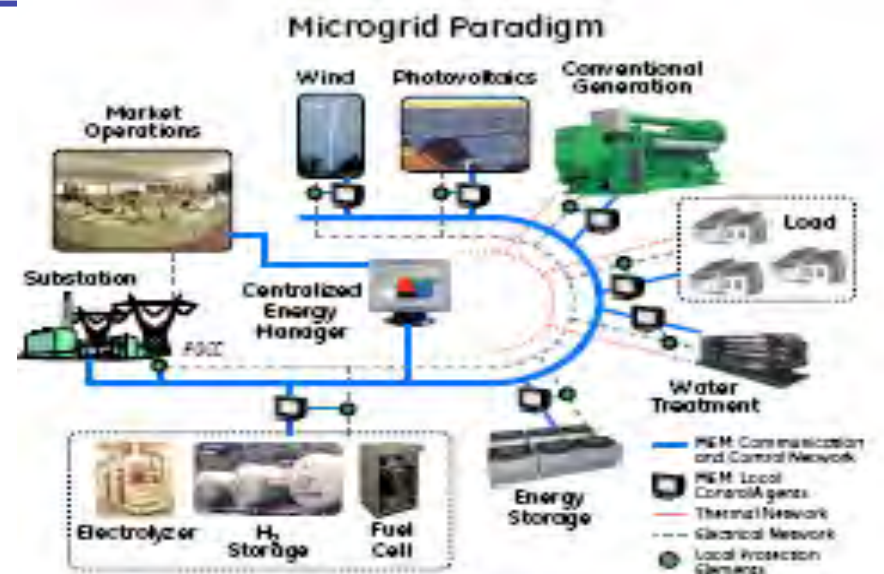
- United Technologies Research Center
 - Lawrence Berkeley National Laboratory
 - University of California, Berkeley
- Multiple Projects
 - Model based performance of single buildings
 - Scalability through reduced order models
 - Campus scale



Smart Micro-Grids

DESCRIPTION

- Enhance and demonstrate an advanced micro grid technology for DoD installations
 - Microgrid design
 - Optimal dispatch
 - Load shedding
 - Intentional islanding
 - Energy management
- Demonstrations at 29 Palms and Ft. Bliss



BENEFITS/METRICS

- Allow secure islanding of DoD installation and reduce costs of electricity
- Increase use renewables, energy efficiency and improve power quality

PERFORMERS

- GE Global Research
 - 29 Palms
- Lockheed Martin
 - Ft. Bliss
- FY 2012 BAA
 - TBD



Low-BTU Landfill Gas Turbine

Acquisition, Technology and Logistics

DESCRIPTION

- Establish economics, reliability, and applicability of the technology to a variety of DoD installations.
- Demonstrate the ability of a unique micro-turbine to generate electrical power from Landfill Gases.
- Demonstration at Ft. Benning



BENEFITS/METRICS

- Landfill gas energy capture technology will reduce the cost of DoD facility energy.
- High number of landfills on DoD installations, implementation of these technologies can yield enormous cost savings and energy security.

PERFORMERS

- Southern Research Institute
 - Greenhouse Gas Institute
- Flex Energy
- SCS Engineers
- Integrity Air Monitoring



Conclusion

Acquisition, Technology and Logistics

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