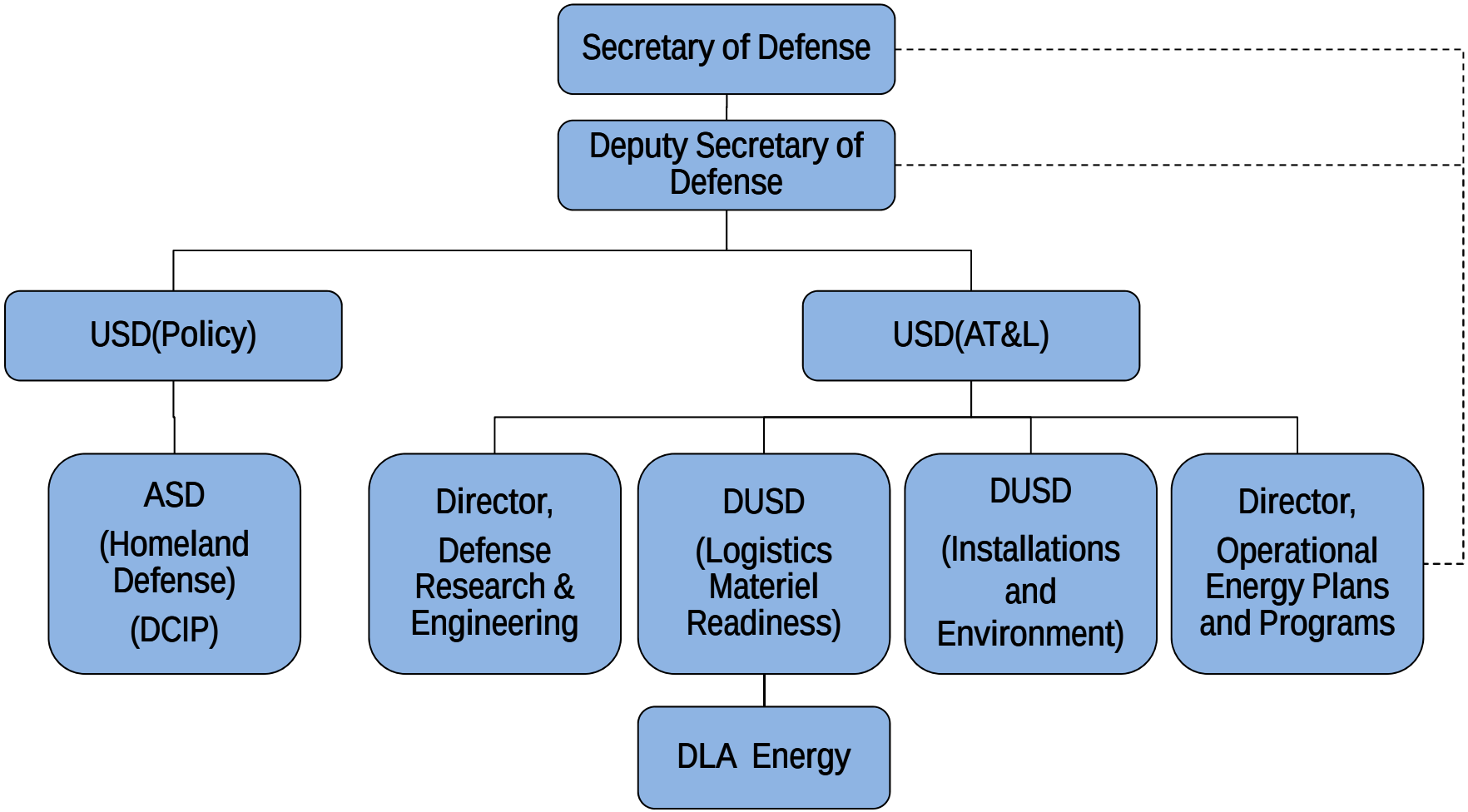
Department of Defense Facilities Energy

Dorothy Robyn
Deputy Under Secretary of Defense
Installations and Environment

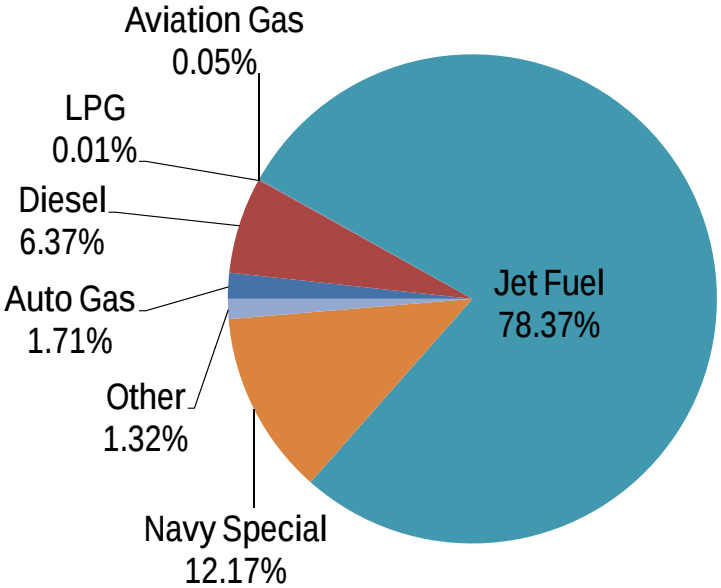
GovEnergy Conference - August 18, 2010

OSD Energy Governance

Acquisition, Technology and Logistics

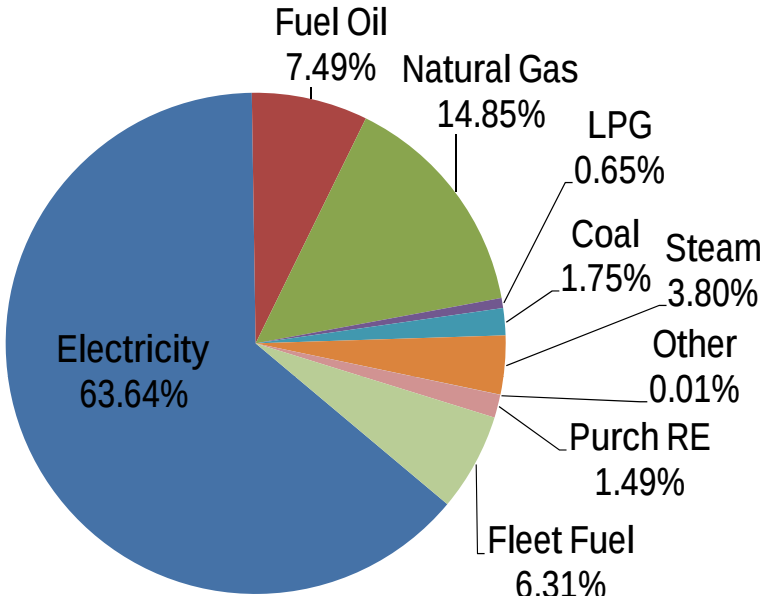


DoD Energy Use, FY2009

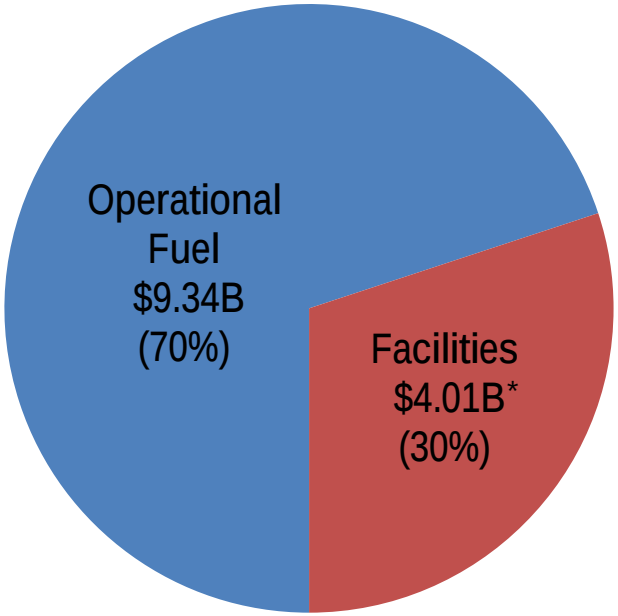


Operational

DoD Energy Costs
FY09: $13.4B



Installations



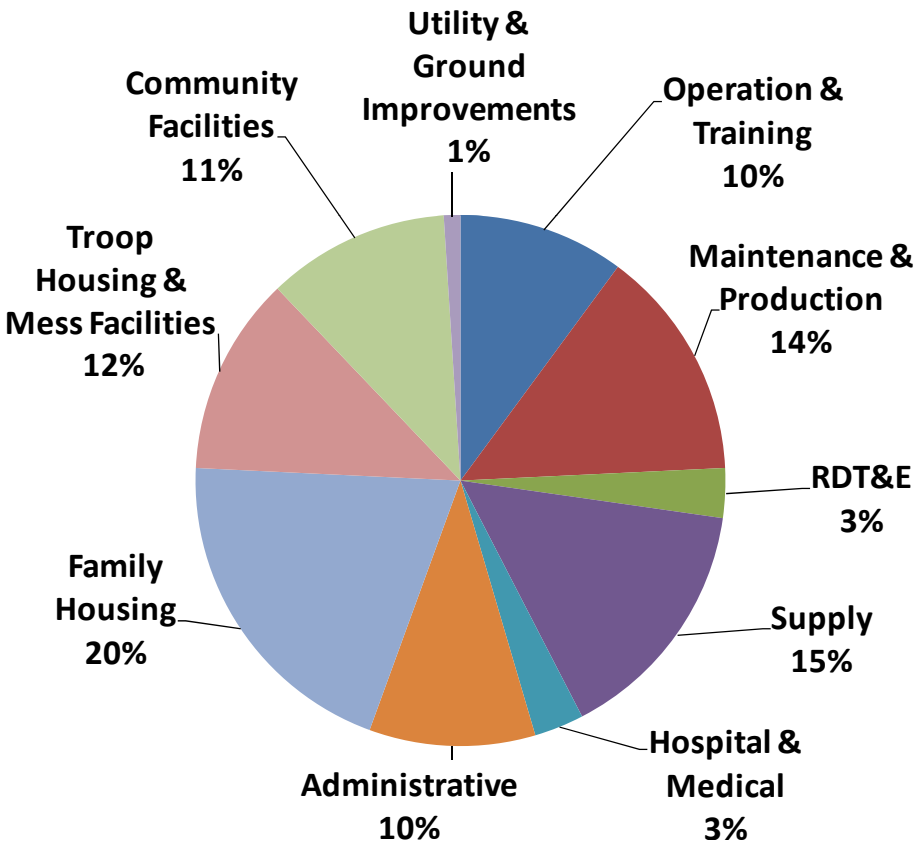
* $4.01B in facilities energy costs include non-tactical vehicle fuel:
$3.784B – facilities energy
$0.225B – non-tactical vehicle fuel

DoD Built Infrastructure

Acquisition, Technology and Logistics

- 539,000 Facilities (buildings, structures, linear structures)
  - 307,295 buildings
    - 2.2 billion square feet
- Comparisons
  - GSA: 1,513 government buildings
    - 176 million square feet
  - Wal-Mart US: 4,200 buildings
    - 687 million square feet
- 160,000 Fleet Vehicles

DoD Building Stock

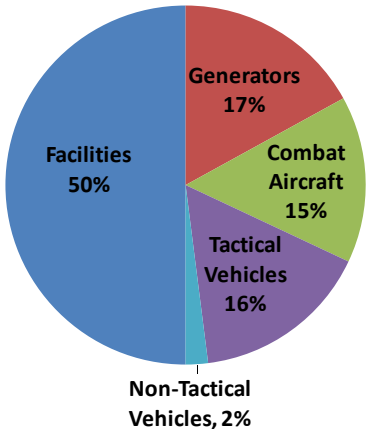


Why Installation Energy Matters

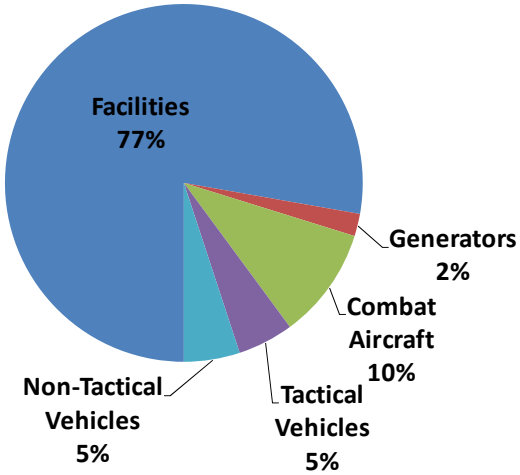
- Installation energy represents a significant cost
  - FY09: $3.8 billion (28% of total DoD energy costs - higher in peacetime)
  - Bill is likely to increase ("grow" the Army and Marine Corps, reduced presence in Iraq and Afghanistan, improved QoL)
  - Contributes a disproportion share (~ 40%) of GHG emissions
- Installation energy management is key to mission assurance
  - DoD's reliance on a fragile commercial electricity grid places continuity of critical missions at serious and growing risk [1]

[1] Defense Science Board, "More Fight – Less Fuel," February 2008

Army
Current Optempo (CO_{2e})



Army
Future Footprint ? (CO_{2e})



DoD Advantages and Impediments to Doing More, Better

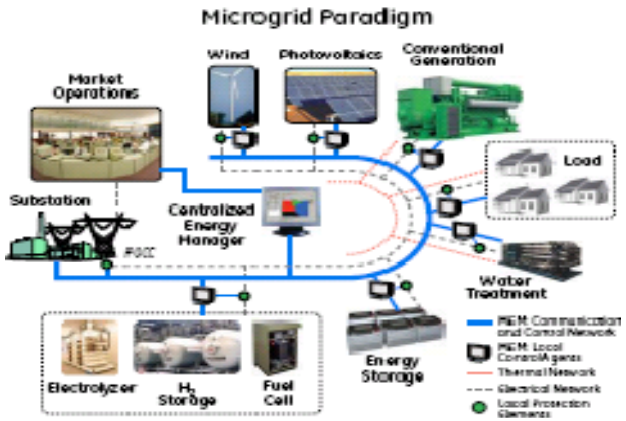
- DoD Advantages
  - DoD is a command driven organization
    - Can effect changes more easily
  - DoD installations are like small cities
    - Can trial urban design, electric grid, and building efficiency concepts
- Impediments
  - Flawed economic incentives impede investment in energy efficiency
    - "Split incentives" (capital investment vs O&M)
    - Commanders can't keep savings from reduced energy consumption
  - Lack of information
    - DoD lacks an enterprise-wide energy information management system
  - Little DoD R&D on installation energy

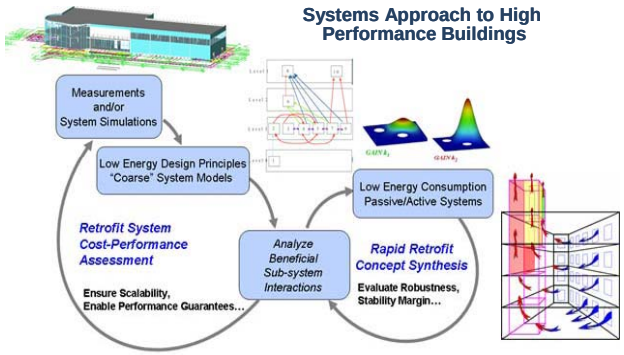
Facilities Energy Core Strategy

- *Reduce Demand* -- energy efficiency and conservation
  - One-sixth of SRM dollars ($1.7B/yr) going to energy efficiency retrofits
  - Leveraging MilCon budget ($20B+)
    - LEED Silver
    - 30% above ASHRAE standards
  - Energy Conservation Investment Program (ECIP)
    - FY10: $174M, FY11: $120M
- *Increase Supply* of renewable energy sources
- Private financing is key
  - ESPCs/ESCOs
  - EULs and PPAs

Test Bed Initiative

- DoD facilities can serve as testbed for new energy technologies
  - DoD's built infrastructure is unique – diverse building types and climates in U.S.
- Sophisticated first user
  - Validate performance, cost, and environmental impacts
  - Directly reach out to private sector for innovations
  - Leverage Department of Energy investments
- Early customer
  - Transfer lessons learned, design and procurement information across all Services and installations
  - Help create a market, as with aircraft, electronics and the internet
- ESTCP is doing this on a small scale



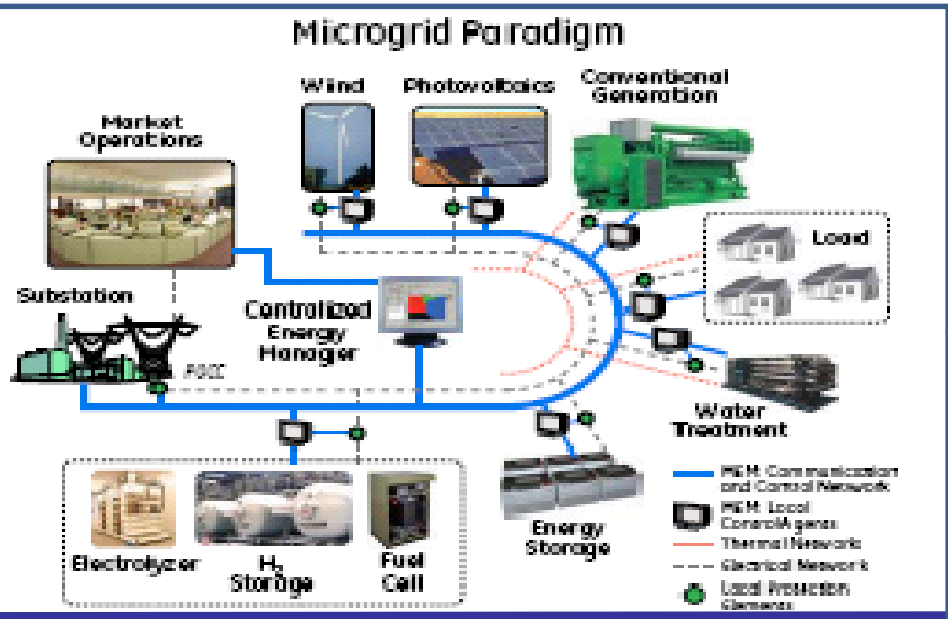


Smart Microgrid

Acquisition, Technology and Logistics

DESCRIPTION

- Enhance and demonstrate an advanced micro grid technology for DoD installations
  - Optimal dispatch
  - Load shedding
  - Intentional islanding
  - Energy management
- Demonstrate cost and performance at 29 Palms



BENEFITS/METRICS

- Allow secure islanding of DoD installation and reduce costs of electricity
- Increase use renewables, energy efficiency and reduce carbon footprint

FUNDING

$2M

- Awarded through competitive solicitation
- GE Global Research
  - Leverages DOE and GE investments

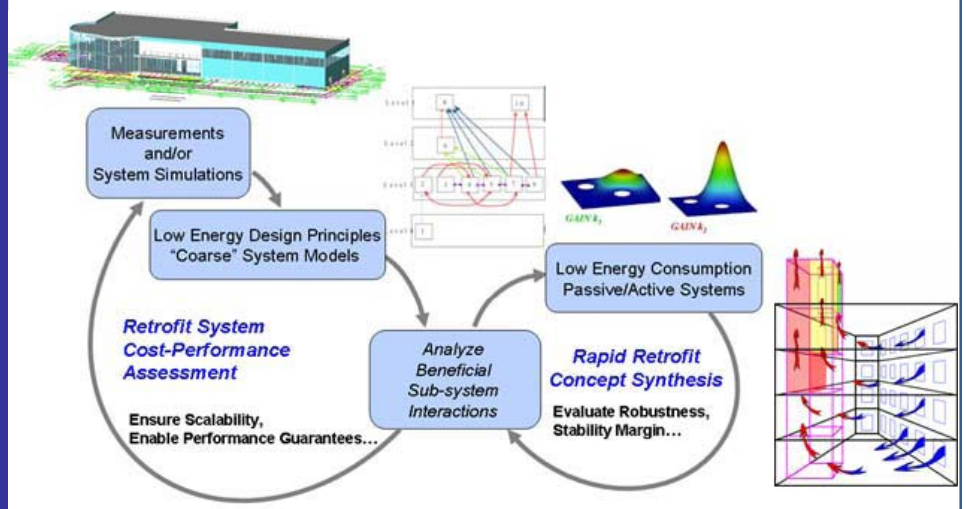
Systems Approach to High Performance Buildings

Acquisition, Technology and Logistics

DESCRIPTION

Develop and evaluate advanced scalable methodologies and tools for design and analysis of low energy systems for DoD building retrofits

- Failure Mode Effects Analysis
- Whole Building Computational Modeling
- System Decomposition and Analysis Tools
- Critical Paraeter Management tools



BENEFITS/METRICS

Efficiency gain of 50% in existing buildings

- Reduce energy costs
- Reduced carbon footprint
- Supports net zero energy installation

FUNDING

$3.3M

- Awarded through competitive solicitation
- United Technologies Research Center
- Virginia Tech
- AimDyn
- Building Intelligence Group
- Robust systems and Strategy

Continuous Building Commissioning

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

Naval Base Ventura County, McGuire AFB, & CERL

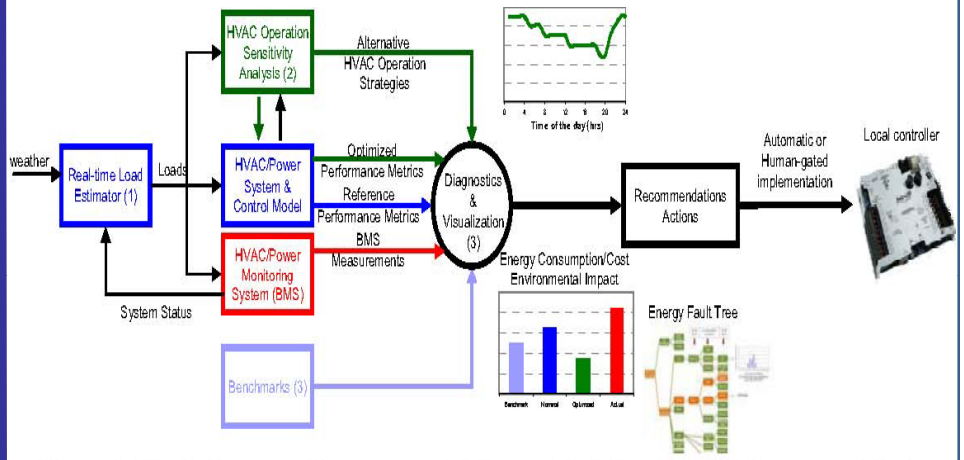


Figure 1. Block diagram of the proposed Advanced Building Energy Management Systems

BENEFITS/METRICS

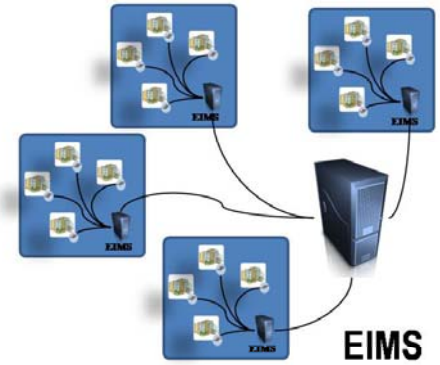
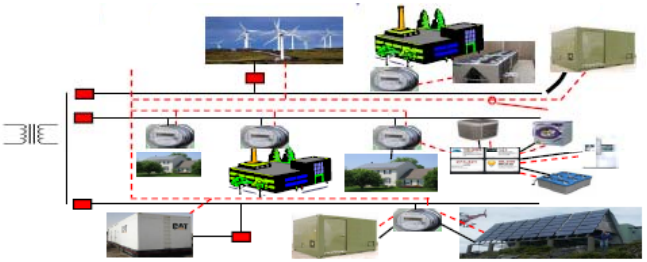
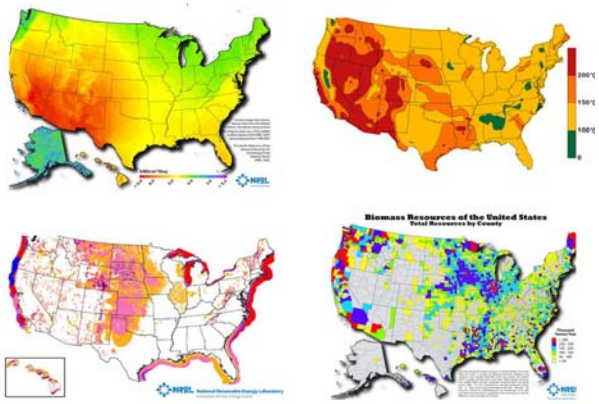
- Demonstrations will document energy savings, costs, reliability and applicability to DoD buildings.
- Successful implementation of this technology will enable reduced energy consumption, peak electric demand, and water use in DoD buildings by providing actionable information to facility managers and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

FUNDING

$3.2M

Awarded through competitive solicitation

- United Technologies Research Center
- Lawrence Berkeley National Laboratory
- University of California, Berkeley
- Oak Ridge National Laboratory

Other Key Initiatives

- Enterprise Energy Information Management
  - We can't manage what we can't measure
  - New OSD initiative to effectively monitor, measure, manage and maintain energy systems at optimal performance level
- Electric Grid Security
  - EGSEC
- Renewable Energy Project Siting
  - Land and airspace compatibility
  - DoD Integrated Product Team