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Sandia National Laboratories

Energy Management Program

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company,
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Sandia Overview

New Mexico Site

- Located on Kirtland Air Force Base in Albuquerque, NM
- Almost 12,000 personnel
- 2,937 acres of DOE-owned land, 5,633 acres of permitted land (totaling 8,570 acres)
- 952 buildings totaling 6.9 million gross square feet
- 49 miles of paved roads, 38 miles of unpaved roads; 206 acres of roads and walkways
- Other utilities include high voltage and standby electrical; steam; natural gas; potable water and fire protection; sanitary and process waste water; storm drainage; chilled water; communications; landscaping; and site access control

Why do Energy Management?

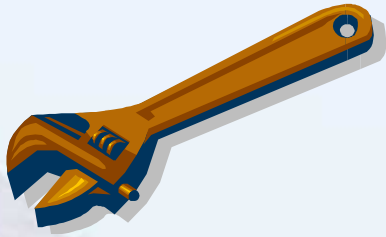
THE HARD FACTS

- Last year SNL spent **$15,000,000** in combined gas & electric usage
- Last year SNL used a total of **447,000,000** gallons of water
- Since 2003, energy intensity has decreased **8%** for regular buildings.

SNL Sustainable Design Implementation

What is the LEED Rating System?

Leadership in Energy and Environment and Design



- Rating system
- A third-party certification program
- Sustainable green building & development practices
- Immediate and measureable performance

SNL Sustainable Design

Documentation and Contracts

- **LEED guidelines have been implemented into the:**
  - Construction Standards
  - Campus Design Guidelines
  - Facilities Design Manual
  - Planning Documents
- **Request for Quotations contain standards and procurement requirements**
- **Procurement Processes**
  - Won Three White House Closing the Circle Awards
  - Contract Requirements include:
    - Recycled Content (Comprehensive Procurement Guidelines)
    - Biobased Products
    - Electronic Product Environmental Assessment Tool (EPEAT) Silver Standard 99% and Gold Standard 50%

LEED and Executive Order 13423

- **EO 13423 Requirements- By 2015:**
  - "Green"15% of capitol asset building stock to meet HPSB Guiding Principles
  - Reduce energy intensity by 30%
  - Reduce water consumption by 16%
  - Green building must be included in site EMS
- **Almost 10% of SNL square footage meet criteria for HPSB Guiding Principles due to LEED NC certification**

LEED and Executive Order 13423 (cont'd)

Leadership in Energy and Environmental Design (LEED) certifications for several buildings:

Three Silver – Joint Computational Engineering Laboratory (JCEL), MESA Lab, Weapons Integrated Facility (WIF)

Three certified – Weapons Evaluation Test Laboratory (WETL), MESA MicroFab Facility (First Fab certification in world), and Center for Integrated Nanotechnologies (CINT)

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CURRENT ACTIVITIES and ACCOMPLISHMENTS

- **Retro-commissioning**
  - **Implementation of the retro-commissioning and energy audit plan**
  - **Focusing on performing retro-commissioning on approximately 25% percent of our square footage per year**
  - **Retro-commissioning performed on buildings: 701, 880 and 6585. Conservative yearly savings estimates for 6585, 880, & 701 are $30k, $47k, and $50k respectively.**

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CURRENT ACTIVITIES and ACCOMPLISHMENTS

- **CICS (Central Irrigation Control System)**
  - **System has been implemented, by weather station controlled irrigation, which provides savings of approx. 8 million gallons of water per year**

- **District Chilled Water Cooling**-Phased Project
  - **Project goals are to increase the overall efficiency of our cooling load significantly, increase reliability, decrease maintenance intensity and operate an optimal number of chillers. Energy savings will be realized due to chiller optimization and decreased pumping energy**

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CURRENT ACTIVITIES and ACCOMPLISHMENTS

- **Metering and Energy Reporting**
  - Metering is necessary to track, report energy use and validate savings. 92% electrical consumption is metered, 100% of water is site metered, 52% of natural gas consumption metered at the building level expected to increase to 75% by year end
  - Reporting – Since 1985 electrical intensity has been reduced by 40%, based on reporting criteria of 430.2A

- **Lighting Retrofits**
  - Over 90% of site square footage has been retrofitted. Annual savings estimated at $352K

- **VFD Installation**
  - Numerous VFD installations throughout Sandia have resulted in significant energy savings. Currently have installed approximately 780 VFD's.

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CURRENT ACTIVITIES and ACCOMPLISHMENTS

- **Chemical-Mechanical-Polishing (CMP) Water Recycling**
  - Utilizes waste process water that was once sent to the sanitary sewer and processes it for use in cooling towers and fume scrubber systems. Annual water savings are 28 million gallons of water per year, compared to previous configuration

- **Thermostat Setback** (2005 President's Directive on Energy and Fuel Conservation)
  - HVAC temperature set points were adjusted to float between 68 and 78 degrees (DDC controlled bldgs only). Energy saving results based on modeling are 2.39×10^9 BTUs based on 30 buildings. This is a hard one to actually measure!

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CURRENT ACTIVITIES and ACCOMPLISHMENTS

- **Energy Awareness**
  - Energy Proclamation signing and associated events with KAFB, DOE/NNSA
  - Provide weekly E-Tips for the SDN.
  - Earth Day and ECD : Activities include speakers and providing information on energy and water conservation.
  - Lights Out Campaigns (KAFB, DOE/NNSA): All Sandians and contractors are encouraged to turn off all non-essential, non-critical plug-loads during the non-standard hours.
  - Earth, Wind and Sun event: Activities are currently being planned and the event will occur July 21st and 22nd.

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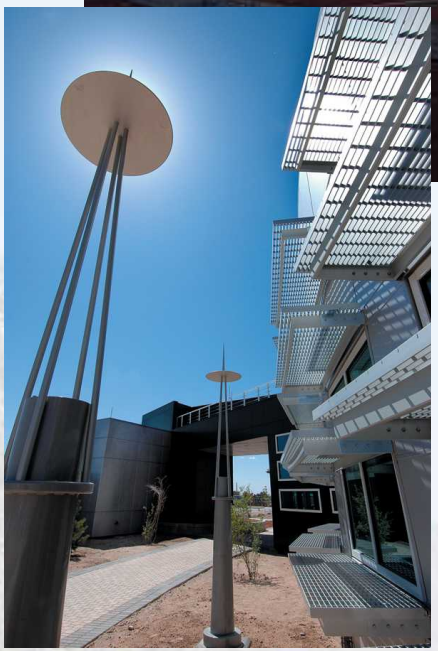
Other Accomplishments



- Solar
  - Three parking lots and two pedestrian walkways have had new lights powered by PV installed.
  - One parking lot has been retro-fitted using PV.

-A 3.15kW PV shade structure for the Innovation Corridor

-Installed 3.2-kW BIPV on a solar energy research building

-Modified ~19,900 computer monitors to transfer to low energy standby mode when not in use, saving more than 3,000 MWH/year

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The Cost of Solar
Conventional vs. Solar

	Conventional (250W light with 25' Pole)	Solar LED (Includes fixture, panel, pole, batteries)
Unit cost	$3,050	$4,500
Trenching ($/ft)*	$66	$0
Wiring ($/ft)	$10	$0
Total Trenching/ Wiring Cost	$7,600	$0
Concrete Base	$950	$950
Light Installation	$300	$300.00
Total Installed Cost	**$11,900**	**$5,750**

Energy Usage	Conventional	Solar LED
kWh/yr	1,186.25	0
kWh rate	$0.08	$0.08
Total Energy Cost	**$94.90**	**$0.00**

*Reflects site which has no existing underground utilities

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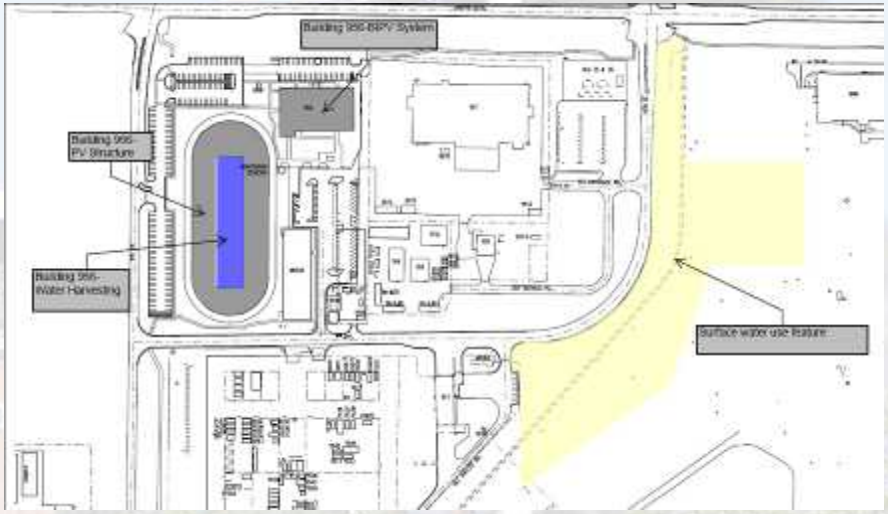
Larger Scale Renewable Systems

PV Movie

- **DETL PV Site Array, 50kW**
- **Sterling Engines 250kW**

EMT Future Projects

- **Building 956 BIPV-55kW system**
- **Building 887, 1 MW PV Shade Structure**
- **Eco-planning**
  - **PV Farms**
  - **Campus water harvesting**



Questions?