



# Laboratory Overview

**Duncan McBranch,  
Deputy Principal Associate Director for  
Science, Technology & Engineering**

**September 8, 2010**



UNCLASSIFIED

Operated by Los Alamos National Security, LLC for DOE/NNSA

LA-UR-10-05524



# LANL: A national security science laboratory serving the national interest

- We anticipate, innovate, and deliver solutions
- We span the spectrum from Discovery through Applied Science to Prototypes
- We utilize the outstanding science, engineering, and technology from our core stockpile stewardship mission for other national needs

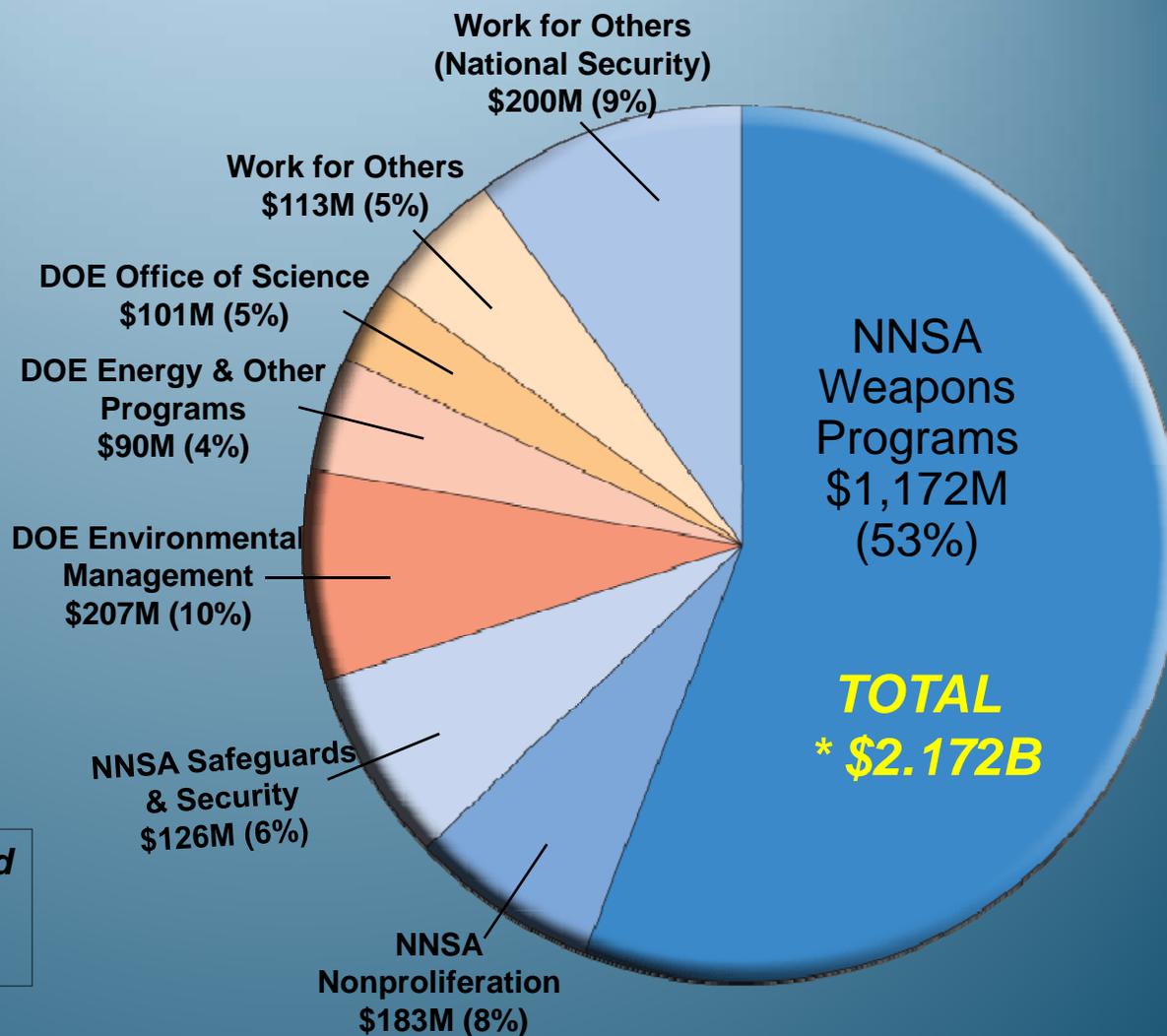


*“It is even more important that the scientific talent and the scientific infrastructure of these nuclear security labs are maintained.”*

Secretary Chu while visiting  
Los Alamos and Sandia National Laboratories in April 2009

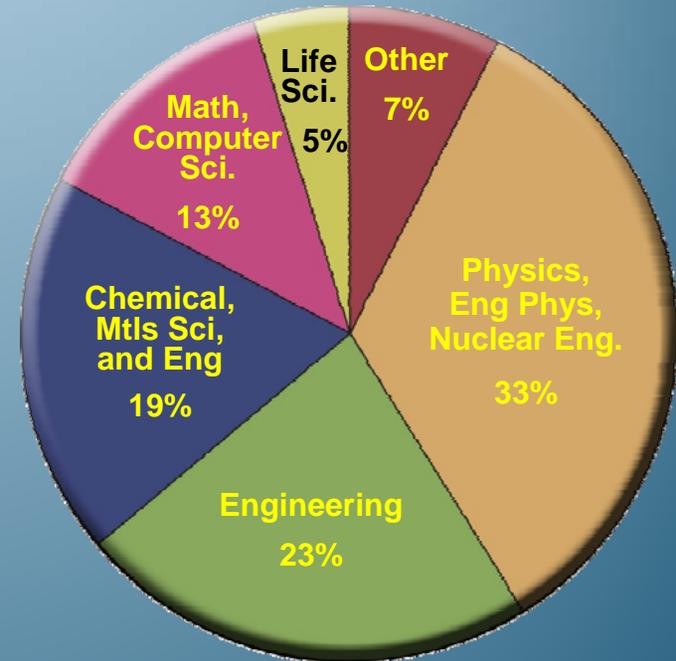
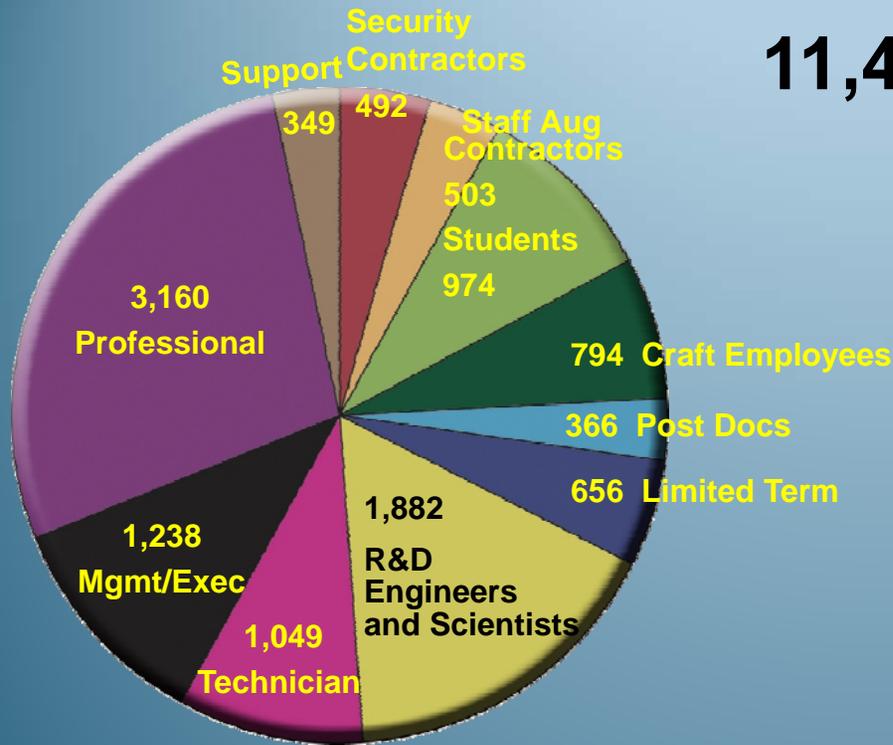
# Lab Budget

\*The Laboratory's FY10 annual budget is approximately \$2.2 billion.



\* Does not include funding received for one-time stimulus projects

# 11,463 - Current Work Force



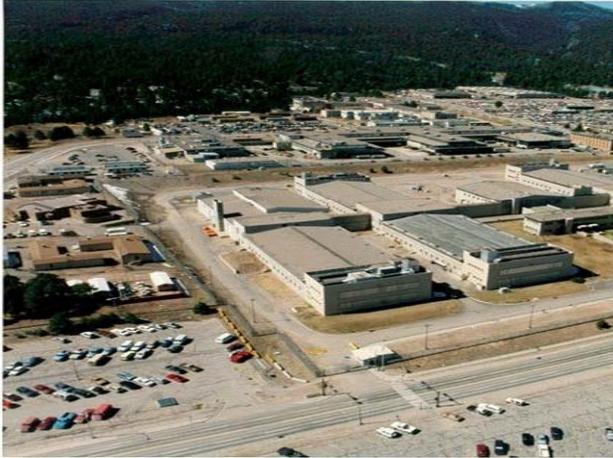
R&D Scientist and Engineer Disciplines

## LANL is: Broad and deep science

- Drawn from across the nation
- 2,211 PhDs
- 28% of career workforce started as students or post docs

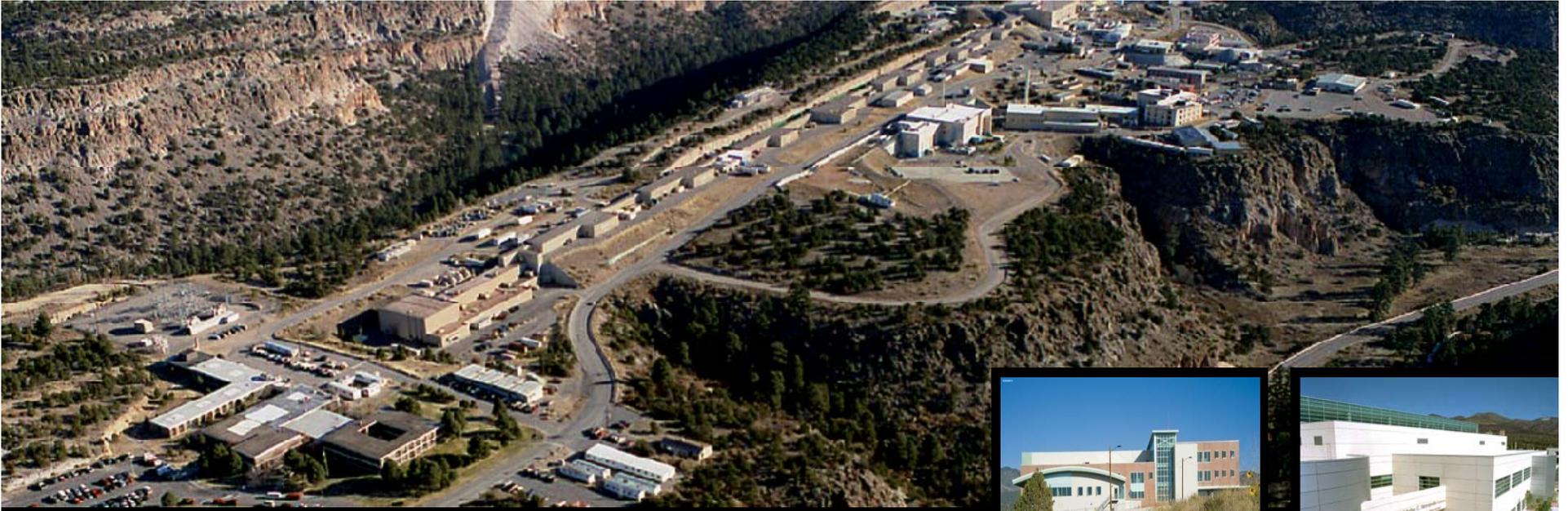
*Our people make Los Alamos great!*

# Los Alamos the oldest, most complex, and second largest site is working hard to transform into a more efficient site



- ~ 40 square miles
- 1,280 buildings with 9.0M gross sq. feet
  - 11 nuclear facilities
  - 40% are more than 40 years old
  - 30% of staff work in poor or failing space
  - \$450M of Deferred Maintenance backlog
- 268 miles of roads (100 paved)
- 1M sq. feet of footprint reduction
- D & D of post-WWII production facilities





## Los Alamos is: Unique facilities

- Nuclear facilities address critical stockpile stewardship challenges
- Supercomputing facilities
- DARHT allows researchers to study weapons performance
- Nanotechnology center drives critical research programs
- LANSCE draws international scientists studying materials



# Sustaining the safety, security and effectiveness of the Nation's deterrent through Stockpile Stewardship is our core mission

- Los Alamos is the design agency for warheads which constitute more than 60% of nation's deterrent and the majority of the on-alert deterrent
- Managed through surveillance and life extension
- Confidence without nuclear testing is based on a more fundamental science and engineering understanding



# Reducing threats of weapons of mass destruction and terrorism is critical to the security of our nation

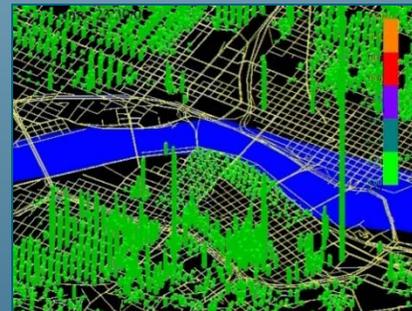
- Space-based nuclear detonation detection, RF and lightning studies
- Imagery analysis and exploitation technology
- Securing nuclear materials in Russia, as well as other nations
- Advances in nuclear detection technology, active and passive techniques, novel materials
- Liquid explosives detector development and testing for homeland security applications



MagViz Security Scanner



GPS- and DSP-based NUDET detectors

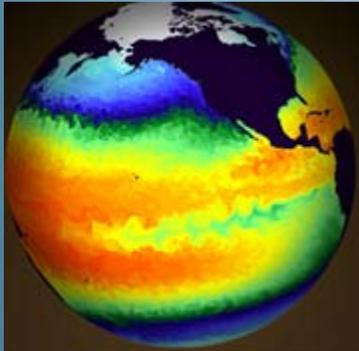


NISAC modeling and simulation



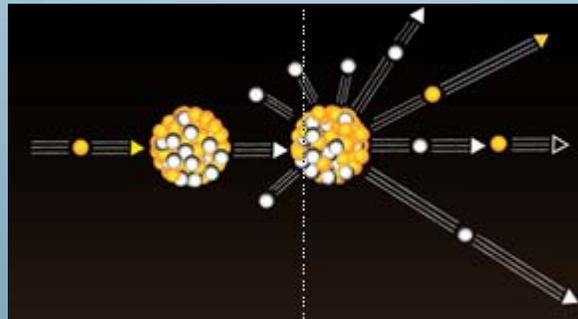
Understanding international nuclear proliferation risks

# Los Alamos Energy Security Pillars



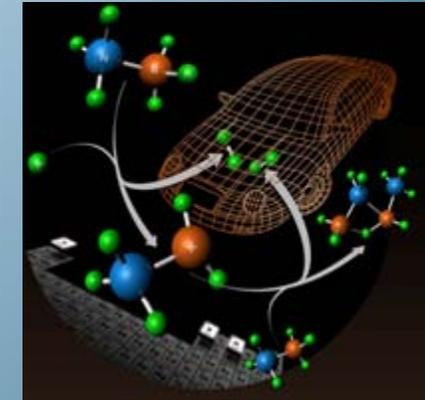
## Impacts of Energy Demand Growth

- Coupled predictive models for climate, infrastructure impact analysis
- Prediction of abrupt change at multiple scales (regional to global)
- Global security and policy implications



## Sustainable Nuclear Energy

- Efficient extraction of energy content from fuel
- Nonproliferation & safeguards
- Effective waste management

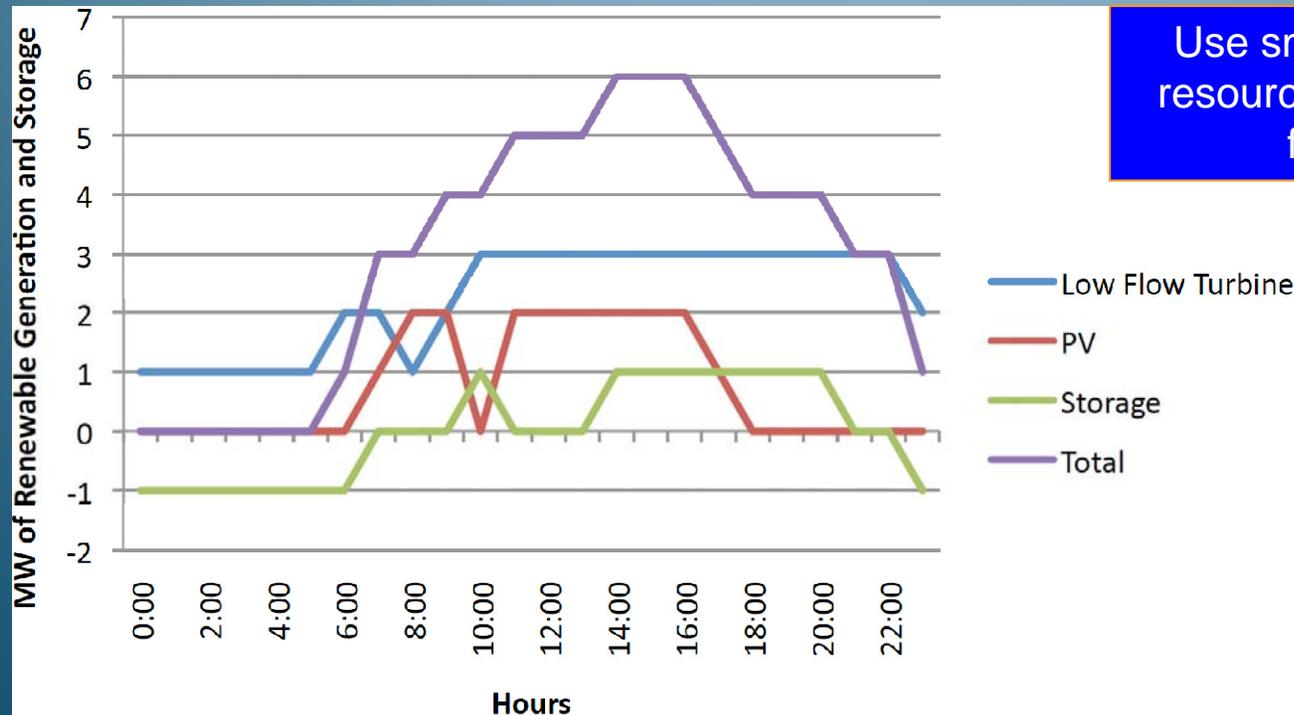


## Concepts and Materials for Clean Energy

- Energy storage, generation, and transmission
- Revolutionary alternatives to petroleum
- Clean fossil energy

# NEDO/Los Alamos County/LANL Photovoltaic Integration and Interconnection Test Bed

Goal: Demonstrate that *utility-scale* PV systems can be cost-effectively integrated into small to mid-sized communities with *minimal impact on the transmission grid* by controlling different mixes of existing and new balancing resources to *mitigate fluctuating PV generation*.



Use smart-grid dispatch of other resources to enable transmission-friendly renewables.



## Unique aspects of the NEDO/LA County/LANL collaboration contribute to its success.

- 150 smart meters on homes and at LANL
- Ability to forecast changes in solar irradiance
- Energy Storage with combination of batteries and pumped water
- Make up fluctuations with hydroelectric power and generators
- Electrical load shedding from LANL facilities
- Provides renewable energy to LANL (2 MW solar, 3 MW hydro)



Abiquiu dam



NSSB

Improve Smart Grid technology by providing tools to forecast changes and balance loads using fully renewable resources.