

*Exceptional service in the national interest*



Sandia  
National  
Laboratories



# Ten-Year Site Plan

FY 2014





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Sandia National Laboratories (SNL) is a contractor-operated, U.S. Department of Energy (DOE)/National Nuclear Security Administration (NNSA)-owned national security laboratory that focuses its science, technology, and engineering (STE) expertise for the security of our nation. As provided in SNL Director Paul Hommert’s statement to Congress in May 2013, “Sandia is uniquely responsible for the systems engineering and integration of the nuclear weapons in the stockpile and for the design, development, qualification, sustainment, and retirement of nonnuclear components of nuclear weapons. While nuclear weapons represent Sandia’s core mission, the science, technology, engineering, and business professional capabilities required to support this mission position us to support other aspects of national security as well. Indeed, there is natural, increasingly significant synergy between our core mission and our broader national security work. This broader role involves research and development in nonproliferation, counterterrorism, energy security, defense, and homeland security.”

This FY 2014 Ten-Year Site Plan (TYSP) highlights Sandia’s integrated site, facility, and infrastructure planning and management approach, contemporary stewardship issues, and investments required for SNL to meet its mission objectives, support the NNSA’s Program of Record, and effectively execute stewardship of its real property assets. In addition to describing SNL’s management approach and processes for maintaining its existing, aging facilities and infrastructure, particularly its mission-critical and mission-dependent assets, the TYSP identifies several projects which, when approved, will provide new or restore/recapitalize existing capabilities required over the planning period for NNSA, non-NNSA/DOE, and non-DOE missions.

Sandia continues to innovate and pursue engineering excellence as it strives to become the laboratory the U.S. turns to for STE solutions to the most challenging problems that threaten peace and freedom for our nation and the world.

Recommended by

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# Acronyms and Definitions

Acronym	Definition
ACRR	Annular Core Research Reactor
AHW	Advanced Hypersonic Weapon
ALT	Alteration
ARG	Accident Response Group
CA	California
CAS	Condition Assessment Survey
CBFI	Capability-Based Facilities and Infrastructure
CREATE	Collaboration in Research and Engineering Advanced Technology and Education
D&D	Decontamination and Demolition
DM	Deferred Maintenance
DoD	Department of Defense
DOE	Department of Energy
DOS	Department of State
DSA	Defense Systems and Assessments
ECIS	Energy, Climate, and Infrastructure Security
EORC	Emergency Operations and Resonse Center
ETG	Explosives Technology Group
F&I	Facilities and Infrastructure
FCI	Facility Condition Index
FIMS	Facilities Information Management System
FIRP	Facilities and Infrastructure Recapitalization Program
FMOC	Facilities Management and Operations Center
FY	Fiscal Year
FYNSP	Future Years Nuclear Security Plan
GPP	General Plant Project
GSF	Gross Square Feet
HE	High Explosive
IAW	Interagency Work
IGPP	Institutional General Plant Project
IHNS	International, Homeland, and Nuclear Security
IPB	International Programs Building
IM	Information Management
IT	Information Technology
JTOT	Joint Tactical Operations Team

Acronym	Definition
KTF	Kauai Test Facility
LEP	Life Extension Program
LI	Line Item
LRDF	Long-Range Development Framework
LVOC	Livermore Valley Open Campus
M&O	Management and Operating
MESA	Microsystems and Engineering Sciences Applications
NG	Neutron Generator
NM	New Mexico
NNSA	National Nuclear Security Administration
NSE	Nuclear Security Enterprise
NW	Nuclear Weapons
NWC	Nuclear Weapons Council
OMB	Office of Management and Budget
OSF	Other Structures and Facilities
OST	Office of Secure Transportation
PSL	Primary Standards Laboratory
R&D	Research and Development
RPA	Real Property Asset
RPV	Replacement Plant Value
S&T	Science and Technology
SCIF	Sensitive Compartmentalized Information Facility
SGT	SafeGuards Transporter
SMU	Strategic Management Unit
SNL	Sandia National Laboratories
SSiFR	Sandia Silicon Fabrication Revitalization
SSP	Site Sustainability Plan
SSPP	Strategic Sustainability Performance Plan
STE	Science, Technology, and Engineering
TA	Technical Area
TTR	Tonopah Test Range
TYSP	Ten-Year Site Plan
U.S.	United States
WEF	Weapons Engineering Facility
WMD	Weapons of Mass Destruction

## 1.0 Executive Summary

### 1.1 Background

Sandia National Laboratories (SNL, Laboratories) is a United States (U.S.) Department of Energy (DOE)/National Nuclear Security Administration (NNSA) multiprogram, national security laboratory managed and operated by Sandia Corporation (Sandia), a wholly owned subsidiary of Lockheed Martin Corporation. In fiscal year (FY) 2012 Sandia had revenue of \$2.6 billion and a workforce of 11,700 located primarily at its four operating sites situated in New Mexico (NM), California (CA), Nevada, and Hawaii. Figure 1.1 provides an aerial view of SNL's main campus in Albuquerque, NM, at Technical Area-I (TA-I).

Within the U.S. nuclear weapons (NW) enterprise, Sandia is uniquely responsible for the systems engineering and integration of the NW in the stockpile and for the design, development, qualification, sustainment, and retirement of non-nuclear components of nuclear weapons. While nuclear weapons represent Sandia's core mission, the science, technology, engineering, and business professional capabilities required to support this mission position the Laboratories to support other aspects of national security as well. Indeed, there is natural, increasingly significant synergy between our core mission and our broader national security work. This broader role involves research and development in nonproliferation, counterterrorism, energy security, defense, and homeland security. The diversity of Sandia's missions is directly related to the current and emerging national security environment consistent with government and DOE/NNSA policies that authorize special access to the Laboratories' unique capabilities. In its *FY 2012–2016 Strategic Plan*, Sandia articulated its core purpose:

*Rendering “exceptional service in the national interest” has been Sandia’s core purpose since 1949. The Labs’ original mission, to provide engineering design, systems engineering, and integration for the non-nuclear components of the nation’s nuclear weapons, continues today. The nuclear weapons mission is our reason for being; it is what makes the organization unique and it creates a foundation from which we leverage our capabilities and provide support to address other national security challenges.”*



Figure 1.1 SNL /NM TA-I

## 1.2 Accomplishments

During fiscal year (FY) 2012, Sandia's collaborative approach to mission support and pursuit of research, development, test, and evaluation (RDT&E) excellence in engineering and science has resulted in numerous noteworthy accomplishments, including some of particular interest to NNSA:

**B61-12 Program:** Transitioned into Phase 6.3, full-scale engineering development, with the Nuclear Weapons Council (NWC) program authorization and supported a Department of Defense (DoD) Cost Assessment and Program Evaluation team in its review of the B61-12 cost and schedule. Figure 1.2 depicts the B61-12 design.



Figure 1.2 B61-12 Design

**W88 ALT 370:** Completed the Phase 6.2/2A feasibility study to develop a replacement arming, fuzing, and firing assembly and received Phase 6.3 approval for full-scale engineering development from the NWC.

**W78/88-1 Life Extension Program (LEP):** Two teams from Sandia, in partnership with Lawrence Livermore and Los Alamos National Laboratories, successfully executed NNSA's 120-day conceptual design study to evaluate interoperable warhead designs for reentry systems with major design drivers, including implementation in both the Mk21 and Mk5 aeroshells, robust safety and security themes, maximum non-nuclear commonality, and cost.

**Gamma Irradiation Facility (GIF):** Successfully achieved approval to downgrade from a Hazard Category 3 nuclear facility to a radiological facility. This substantially reduced regulatory compliance requirements and operating costs while maintaining operational and experimental capabilities.

**Microelectronics and Microsystems:** Demonstrated single-chip heterogeneous integration using flip-chip die attach and substrate removal to integrate gallium arsenide (GaAs)-based integrated circuits onto non-native substrates. This important advance provides an integration environment that enables smaller, lower power, higher-reliability, mixed-technology integrated circuits and microsystems. (See Figure 1.3.)

**Advanced Hypersonic Weapon (AHW):** Conducted the first test flight of the AHW from the Kauai Test Facility (KTF), which demonstrated the viability of the boost-glide approach to long-range atmospheric flight and data collection on a variety of advanced technology subsystems.

**Primary Standards Laboratory (PSL):** Successfully renewed its ISO/IEC 17025 accreditation from the National Voluntary Laboratory Accreditation Program, which required an in-depth technical evaluation of PSL procedures, technical competency, and quality management systems.

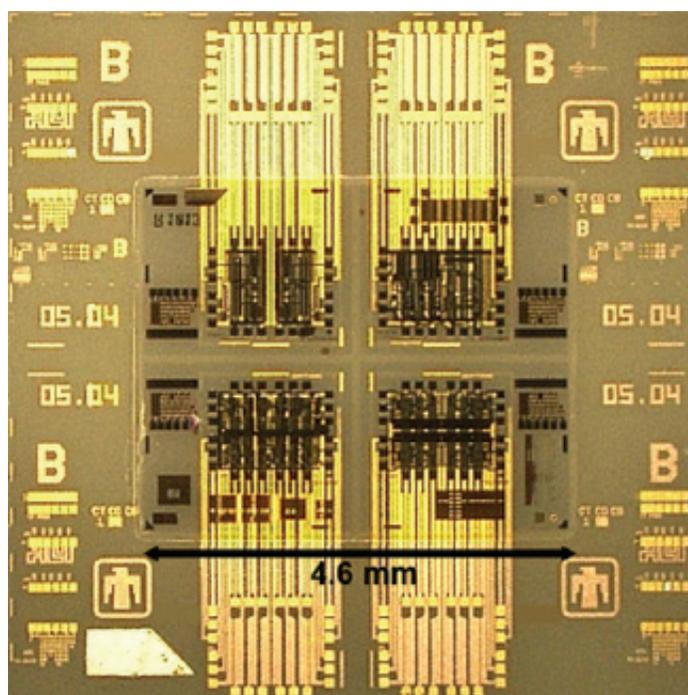


Figure 1.3 Optical Micrograph

### 1.3 Facilities and Infrastructure Strategy

Sandia continues to pursue a “capability-based” approach to site stewardship to attain the Program of Record; it is both responsive to the mission needs of its diverse customer base and fiscally responsible for the multibillion-dollar federal investment in real property assets. Sandia’s *FY 2012–2016 Strategic Plan* articulates and further emphasizes the basis for its real-property management strategy, which will provide mission-enabling infrastructure to address and support Sandia’s five Strategic Objectives:

1. Deliver with excellence on our commitments to the unique nuclear weapons mission.
2. Amplify our national security impact.
3. Lead the Complex as a model 21st-century government-owned/contractor-operated national laboratory.
4. Excel in the practice of engineering.
5. Commit to a learning, inclusive, and engaging environment for our people.

Proactive stewardship of the Laboratories’ facilities and infrastructure (F&I) is central to achieving these objectives; however, Sandia’s stewardship faces many technical challenges, competing interests, administrative requirements, and severely constrained resources. The implementing F&I strategy consists of the following elements:

- Formalized planning focused on sustaining core capabilities
- “Risk-based” prioritization of initiatives intended to reduce risk associated with mission performance
- Project execution phased according to the availability of funding and DOE guidance
- Comprehensive master planning

Sandia’s F&I planning flow is tied to and derived from the NNSA’s Program of Record as depicted in Figure 1.4. Sandia’s F&I strategy addresses required investments by adopting the principles and employing the strategies depicted in Figure 1.5. Sandia’s approach includes efforts to increase productivity, reduce long-term operational costs, reduce energy intensity, and demonstrate a fiscally responsible approach to ensure adequate cost control for customers.

Sandia established the following objectives to guide its planning and prioritization:



Figure 1.4 SNL F&I Planning Flow

- Remove or remodel substandard space.
- Improve productivity of mission through collocation and improvements to space quality.
- Improve the facility condition index (FCI) by reducing deferred maintenance (DM).
- Increase space utilization for office, laboratories, and storage.
- Explore the feasibility of nontraditional funding strategies such as third-party financing.

Regardless of funding source, mission, or customer, the F&I supporting Sandia’s technology base will require revitalization; continued renewal and replacement of aging infrastructure; replacement and modification of buildings, structures, and utility systems; refurbishment of fire protection systems; and improvement or installation of modern telecommunications systems to meet increasingly stringent security and data-transfer demands. F&I investment and recapitalization are integral to mission support and require management vigilance and stewardship discipline.

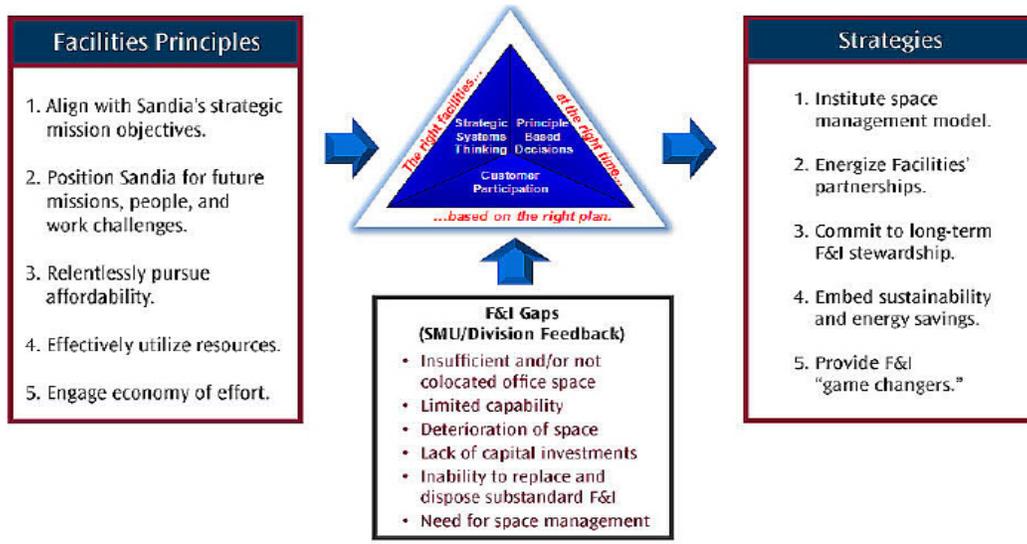


Figure 1.5 F&I Principles and Strategies

Over the extended planning period, Sandia has proposed many F&I projects in response to the requirements established in NNSA’s Program of Record and anticipated new technologies and capabilities, which are highlighted in Section 5.0 and detailed in Sandia’s Infrastructure Data Sheet (IDS) located in NNSA’s Infrastructure Data Analysis Center (IDAC).

The future state of SNL is more than a collection of individual projects, just as Sandia is more than a collection of programs and organizations. Building on the foundation established by the *Ten-Year Site Plan* (TYSP) and DOE Order 430.1B, *Real Property Asset Management*, Sandia has formally implemented master-planning principles that are currently embedded in its internal *Long-Range Development Framework* (LRDF). The LRDF is a planning tool that provides the overall framework and guidance for land and infrastructure development through the application of high-level principles and strategies. The LRDF sets the “stage” for the attendant sub-area plans. Figure 1.6 introduces the “Sandia/NM Village Concept” from the TA-I sub-area future development plan.

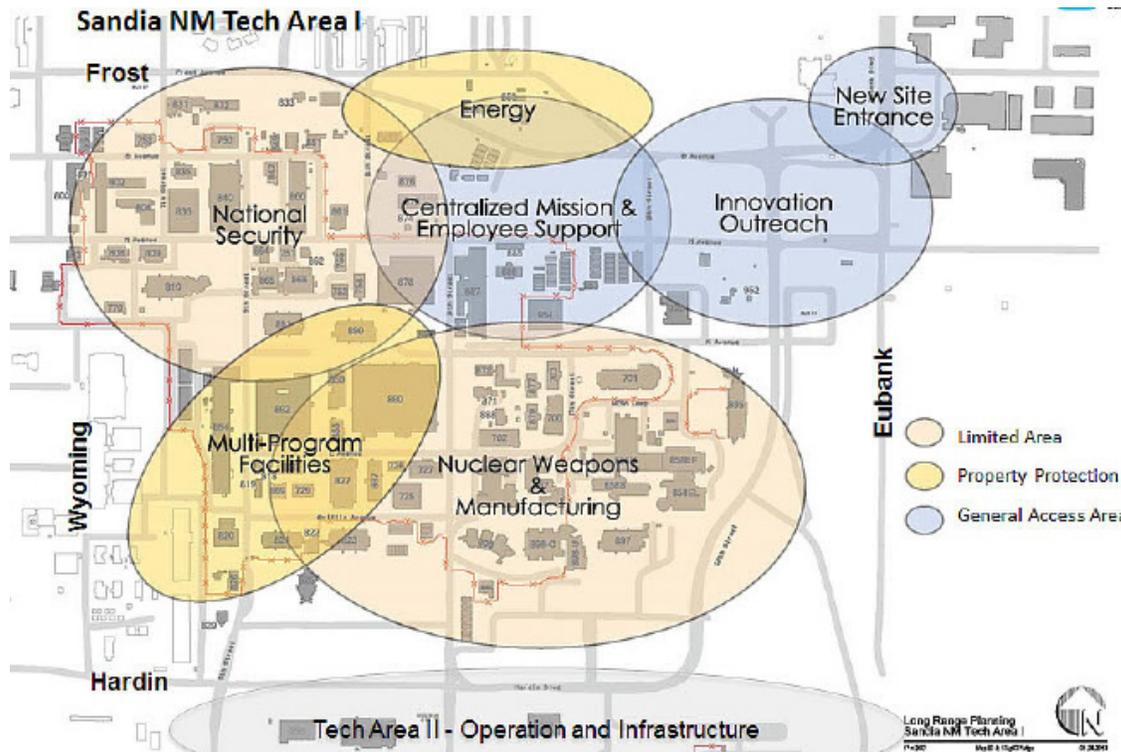
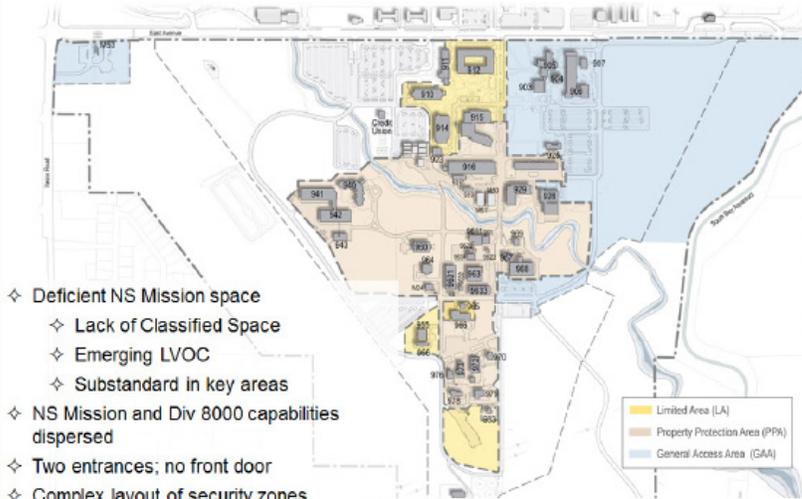


Figure 1.6 SNL/NM Village Concept

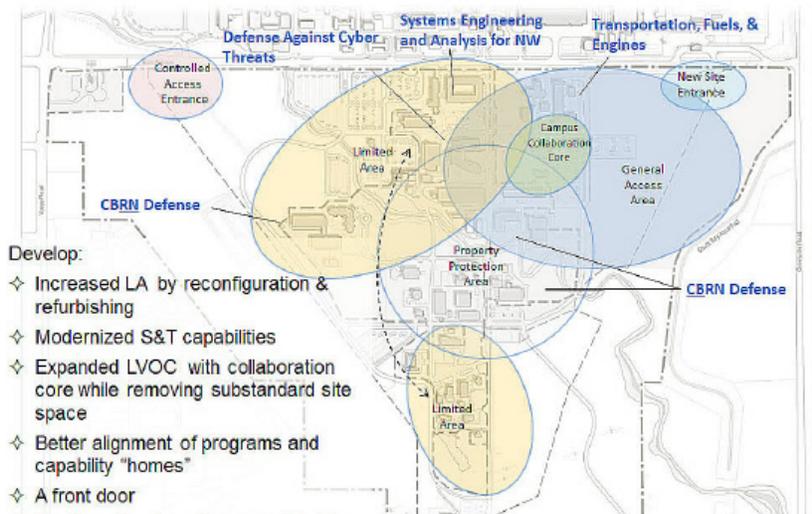
### CA Site – Current State



- ❖ Deficient NS Mission space
  - ❖ Lack of Classified Space
  - ❖ Emerging LVOC
  - ❖ Substandard in key areas
- ❖ NS Mission and Div 8000 capabilities dispersed
- ❖ Two entrances; no front door
- ❖ Complex layout of security zones

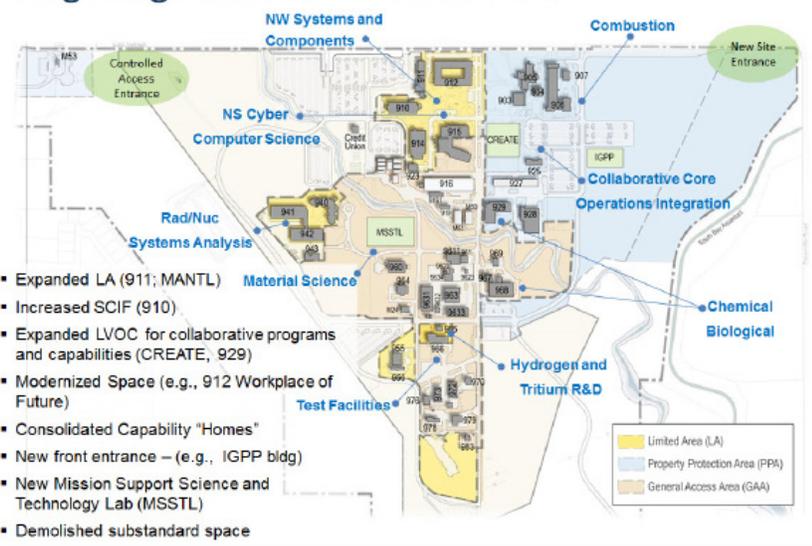
The LRDF provides a sound strategic framework for decision-making pertaining to capital investments in real property assets and site infrastructure. Customer, land use, transportation, security, environmental and sustainability considerations, when considered together, will enable Sandia to shape the design of development projects in ways that benefit project customers, the workforce, the company, the nation, and the environment. Figure 1.7 introduces a managed master plan for developing the SNL/CA campus.

### Site Master Plan Concept



- Develop:
- ❖ Increased LA by reconfiguration & refurbishing
  - ❖ Modernized S&T capabilities
  - ❖ Expanded LVOC with collaboration core while removing substandard site space
  - ❖ Better alignment of programs and capability "homes"
  - ❖ A front door
  - ❖ Configuration to reduce security risks

### Long Range Site Plan – Future State



- Expanded LA (911; MANTL)
- Increased SCIF (910)
- Expanded LVOC for collaborative programs and capabilities (CREATE, 929)
- Modernized Space (e.g., 912 Workplace of Future)
- Consolidated Capability "Homes"
- New front entrance – (e.g., IGPP bldg)
- New Mission Support Science and Technology Lab (MSSTL)
- Demolished substandard space

Figure 1.7 SNL/CA Master Plan Concept

Sandia addresses the following specific strategies in its master planning processes:

- Sustainability
- Overall growth
- Land use and development
- Internal circulation and interaction
- Gateways and approaches
- Security and safety
- Site utilization
- Surety

Sandia's F&I vision is to provide a smaller, safer, more secure, and less expensive enterprise that leverages the scientific and technical capabilities of the workforce and meets national security requirements. Sandia must analyze trade-offs to ensure each new investment

- represents optimal long-term use of land and capital.
- improves the synergy of campus and community.
- provides the capacity and agility to meet current and future missions to support Sandia's strategic planning.
- maximizes efficiency/effectiveness and minimizes long-term operations and maintenance.
- contributes to a stronger and more vital intellectual and research community.
- enhances the quality of the environment and quality of life for those employed at SNL.
- preserves and enhances the legacy of landscape and architecture.

## 1.4 Current State

Sandia recognizes that, as its F&I ages and its recapitalization needs grow, NNSA's resources will be level, at best, and funding for capital investments across the Nuclear Security Enterprise (NSE) will become more difficult to obtain. Because SNL is a multiprogram laboratory, it continues to struggle with the challenge of securing the necessary capital to invest in integrated mission work F&I, which supports the total national security mission.

In the upcoming decade, Sandia will face challenges to meet its commitments to the NSE and other national security mission work, which also benefit the NW program. NNSA and Sandia continue to evolve strategies seeking alternative approaches to fund capital investments to further advance the NSE science, technology, and engineering base along with interagency work (IAW) as further discussed in Section 6.0. As SNL facilities and enabling infrastructure are aging, support for NNSA core capabilities and future mission-related deliveries is at risk, requiring significant recapitalization while the pressure to reduce the federal budget is increasing. This may result in the lack of agility to reliably support the Program of Record and other envisioned national security mission growth. To build a sustainable future, Sandia must work closely with NNSA/DOE on innovative capital investment and reinvestment strategies to support both the NNSA and broader national security missions.

## 1.5 Focus Areas for the Ten-Year Planning Horizon

During the next ten years, Sandia's largest single investments are as follows:

- Plan, design, and construct the Weapons Engineering Facility (WEF) to collocate core NW organizations in modern facilities and excess major building that are at the end of their designed service lives.
- Implement the \$150 million Sandia Silicon Fabrication Revitalization (SSiFR) initiative to replace and modernize facilities and capital equipment to sustain outdated processes in the Microsystems and Engineering Sciences Applications (MESA) Complex.
- Plan, design, and construct the Emergency Operations and Response Center (EORC) to provide emergency-incident management from a modern facility that serves and supports both local and national response teams.
- Construct three light laboratory/office buildings to facilitate the deactivation and eventual demolition of Building 892, a 60-year old facility that is rapidly approaching functional obsolescence and carries \$68 million in calculated deferred maintenance (Figure 1.8). These buildings will serve as turnaround space for future renovations when WEF is complete.



*Figure 1.8 Building 892*

Over the next decade, Sandia must address the following critical challenge areas:

- Securing sufficient F&I investment, reinvestment, and disposition funds to maintain mission critical and mission dependent facilities in a “fit-for mission-use” condition that promotes operational safety, worker health, environmental compliance, property preservation, facility performance, and overall cost effectiveness.
- Negotiating a management approach that will comply with the Office of Management and Budget’s (OMB) “freeze the footprint” directive and allow Sandia to effectively manage its F&I investments.
- Creating and sustaining timely support for Sandia’s Mission Support Science and Technology Laboratory, Sandia Research Reactor Facility, and Rad-Hard Foundry NW line item investments, and the Lawrence Livermore National Laboratory/SNL Livermore Valley Open Campus (LVOC) third-party-financing initiative.
- Developing alternative financing opportunities and/or sponsors for significant multi-program and non-NW major construction investment projects.

## 2.0 Site Overview and Snapshot

Sandia captured the essence of its history and evolution in its *FY 2012–2016 Strategic Plan*:

*Sandia National Laboratories' roots trace back to World War II's Manhattan Project and the development of the first atomic bombs. It became an independent laboratory in 1949, with responsibility for nuclear weapon ordnance engineering and production coordination. Our 62-year history reflects the evolving national security needs of postwar America.*

*Throughout the Cold War, Sandia played a pivotal role in ensuring the safety, security, and reliability of the nation's growing nuclear arsenal. We developed unique expertise in systems engineering with responsibility for the research, design, and development of more than 90 percent of the approximately 6,500 non-nuclear components of a modern nuclear weapon. These components have included security systems, arming and fuzing mechanisms, safety systems, neutron generators, gas transfer systems, and instrumentation.*

*In 1992, Sandia faced new challenges when the United States stopped producing new warheads and halted nuclear testing, the ultimate guarantee of reliability and performance. The era of science-based stockpile stewardship required new predictive capabilities to certify performance of aging weapons and ensure the weapons would remain safe and effective following any redesign or component replacement. We used our advanced computer capabilities to simulate weapon performance and created new facilities to conduct acute non-nuclear tests of whole weapons systems to validate the computer simulations. One such facility is Sandia's Z machine, the world's most powerful X-ray source, which is used to study the physics involved in nuclear reactions and survivability issues related to the nuclear stockpile. Recent challenges include the W76 and B61 Life Extension Programs (LEPs), which involve the redesign and replacement of numerous aging components to ensure the weapons remain safe, secure, and reliable for the foreseeable future. Today's highly specialized electrical, microelectronic, and electromechanical weapons components can have more than 200 parts in a volume the size of a cellular telephone.*

*Sandia has evolved into a multiprogram national security laboratory that provides technologies to protect the nation's infrastructure, including its transportation, energy, telecommunications, and financial networks; ensure clean, abundant, and affordable energy and water; reduce the proliferation of weapons of mass destruction; help maintain U.S. military systems superiority; and defend our nation against terrorist attacks.*

Sandia manages and executes its programmatic work through its four Strategic Management Units (SMUs), described in Table 2.1.

**Table 2.1 SMU Descriptions**

Strategic Management Units	
<b>Nuclear Weapons (NW)</b>	Manages the nation's nuclear weapons stockpile, provides our customers with research, development, and testing services, and manufactures specialized non-nuclear products and components for national defense and security applications.
<b>Defense Systems and Assessments (DSA)</b>	Supports the military, assessment, and nonproliferation community by applying the Laboratories' engineering, science, and technology capabilities to develop innovative systems solutions for the toughest national security challenges.
<b>Energy, Climate, and Infrastructure Security (ECIS)</b>	Provides knowledge and solutions for the nation's most challenging problems in energy, climate, and infrastructure. ECIS capitalizes on the cyber competencies and synergies within these three areas to create unique solutions for the nation and champions the Energy Security corporate strategic cyber and nuclear security corporate strategic thrusts.
<b>International, Homeland, and Nuclear Security (IHNS)</b>	Focuses on the protection of nuclear assets, nuclear materials, nuclear emergency response, nonproliferation, counterterrorism, and arms control. IHNS champions and integrates many of Sandia's counter-WMD (chemical, biological, radiological, nuclear, and explosives threats) programs, enabling high-level customer engagement and leveraging the development of lab capabilities to support this mission.

In FY 2012, Sandia managed a total revenue of just over \$2.6 billion. Figure 2.1 provides a funding breakdown by source and Figure 2.2 provides a funding breakdown by SMU.

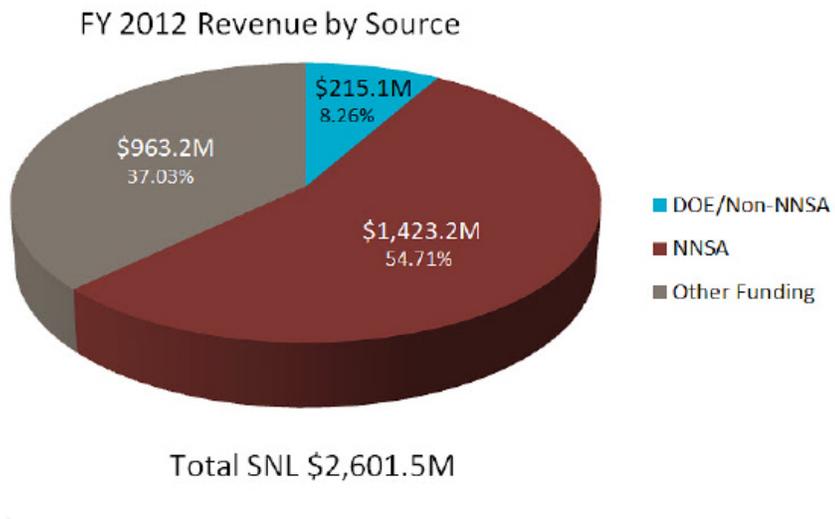


Figure 2.1 Revenue by Source

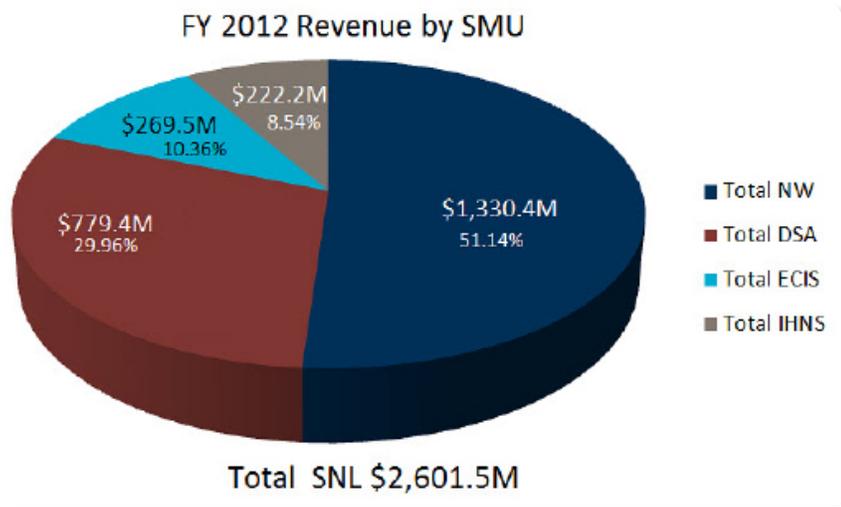


Figure 2.2 Revenue by SMU

Sandia currently has an onsite Management and Operating (M&O) contractor (regular and limited-term employees and staff augmentation contractors) workforce of approximately 11,700, with 9,500 regular employees and a gross annual payroll of just over \$1 billion.

Table 2.2 provides an overview of real property distribution at Sandia's four primary locations and its leased facilities. In aggregate, SNL comprises more than 7.2 million gross square feet (GSF) of real property assets (owned, permitted, and leased space), in 1,171 buildings and structures on 193,500 acres, with a calculated replacement plant value (RPV) in excess of \$5.4 billion and an associated DM backlog of \$527 million.

*Table 2.2 Real Property Distribution at SNL*

Location	Number of Buildings & Trailers	Number of Other Structures & Facilities (OSFs)	Acres	Gross Square Feet (GSF)	Deferred Maintenance (DM)	Replacement Plant Value (RPV)
Albuquerque, New Mexico	552	242	13,758	5,756,928	\$345,947,735	\$3,992,949,007
Livermore, California	67	39	410	885,994	\$107,504,851	\$920,882,282
TTR, Nevada	60	82	179,200	120,925	\$51,967,183	\$328,296,717
KTF and Maui, Hawaii	56	53	133	61,778	\$21,926,505	\$99,080,117
Leases	19	1	-	394,316	-	\$90,892,875
<b>SNL Total</b>	<b>754</b>	<b>417</b>	<b>193,501</b>	<b>7,217,928</b>	<b>\$527,346,274</b>	<b>\$5,432,100,999</b>

Of the 14 core capabilities established by the NNSA in its current TYSP guidance, Sandia supports the six identified in Table 2.3.

*Table 2.3 Sandia-Supported Core Capabilities*

Core Capabilities	
C1	Design, Certification, Testing, Experiments, Surveillance, and STE Base
C5	High Explosives
C6	Non-Nuclear
C10	Enabling Infrastructure
C11	Counterterrorism and Counterproliferation
C12	Support of other Mission/Program Capability

## 3.0 Assumptions

Development of this TYSP included the following assumptions:

1. NW-related work will continue as Sandia's fundamental and foundational national security mission, and its role in the NSE will serve as SNL's strategic planning cornerstone.
2. Although SNL is a multisite, multiprogram laboratory with numerous customers, it is managed and operated as a single, integrated, and unified organization dedicated to the advancement of national security. Sandia is singularly "all missions, all sites." Figure 3.1 provides an aerial view of one of Sandia's four main sites, the SNL/CA campus.



*Figure 3.1 SNL/CA Campus, Looking South*

3. From a real property investment perspective, NNSA's NA-10 (Defense Programs) retains primary programmatic responsibility for NW-centric facilities while NA-00 (Infrastructure and Operations) assumes primary programmatic responsibility for multiprogram NNSA facilities and enabling infrastructure.
4. Line Item (LI) (major construction) projects identified in the *FY 2014 Future Years Nuclear Security Plan* (FYNSP) are the WEF (NA-10), which initiates design in FY 2016 and completes construction in FY 2020; and the EORC (NA-00), which initiates design in FY 2016 and completes construction in FY 2019.
5. Sandia must maintain the capability to rapidly develop new technologies or novel uses for existing technologies in response to unanticipated national security threats; in particular, robust new design and production technologies applicable to the current and future mission work for NNSA and other government agencies.
6. Sandia's workforce and F&I will be sized to meet its NNSA and IAW programmatic objectives, within budgetary constraints.
7. Sandia will continue to experience near-term growth in terms of funding and required staffing for both its NW and IAW missions. This increase has placed considerable pressure on already constricted amounts of available office and laboratory space.

8. Sandia will reduce its NW footprint as mission activities and associated F&I are consolidated over the planning period in the southeast quadrant of TA-I.
9. It remains NNSA's intent and Sandia's plan to divest itself of management and operations responsibilities for its facility at Mount Haleakala, Maui. NNSA is evaluating its landlord role at the KTF. Figure 3.2 provides a view of the Launch Operations Building at the KTF.
10. Sandia is working closely with NNSA and DOE as they develop policy and guidance for implementing the OMB's "freeze the footprint" directive. The manner in which this directive is implemented can have a significant impact on Sandia's ability and plans to pursue future building investments, specifically new space, renovation of existing space, and decontamination and demolition (D&D).



*Figure 3.2 Launch Operations Building at KTF*

## 4.0 Changes from Prior Year TYSP

The items listed below represent the most significant changes from Sandia's FY 2012 TYSP.

1. Though the planning period for the TYSP has reverted to a ten-year from the twenty-five-year timeframe stipulated for the FY 2013 release, there will still be a limited "broad stroke" discussion addressing the "strategic horizon" out through 2038, particularly as it relates to LI major construction projects.
2. In FY 2012, NA-10 authorized project concept studies in an effort to initiate the development of a long-term strategy for identifying and constructing its next-generation "large-scale" experimental science facilities. In response, Sandia developed and proposed the following three concept projects:

- Center for Heterogeneous Integration Packaging and Processes (CHIP<sup>2</sup>)
- System Analysis Lab for Simulation and Assessments (SALSA)
- Short-Pulse Accelerator and Reactor Center (SPARC)

Though these projects are no longer under consideration, Sandia continues to evaluate the capability gaps they were intended to address.



*Figure 4.1 Livermore Valley Open Campus Conceptual Image*

3. Sandia is actively exploring third-party financing options for its LVOC initiative (Figure 4.1) and has received approval to proceed with conceptual design for the initial project entitled Collaboration in Research and Engineering Advanced Technology and Education (CREATE) with receipt of Critical Decision 0 in April 2013.
4. DM and FCI calculations and projections have increased. This is the result of Sandia's implementation of a new Condition Assessment Survey (CAS), updates to some of the RPV models used for key assets, and changes to DOE mandated site factors, a variable in the RPV algorithm.
5. The Capability-Based Facilities and Infrastructure (CBFI) program was intended by NA-10 to start in FY 2013 and provide additional F&I funding support as the Facilities and Infrastructure Recapitalization Program (FIRP) came to a close. CBFI was considered a "new start" and the federal government is operating under a "continuing resolution" throughout FY 2013, so CBFI was never funded. With the creation of NA-00 (Infrastructure and Operations) within NNSA, the exact future and rollout of this initiative is expected to change dramatically.
6. Recent acceleration of the B61-12 and W88 ALT NW programs, coupled with strong growth in workload projections for Defense Systems and Assessments (DSA) programs, has placed considerable pressure on available office and laboratory space at SNL. Figure 4.2 provides related occupancy projections for SNL/NM TA-I. Sandia is aggressively realigning the internal distribution of existing space to support its current NW growth as it continues to execute its institutional general plant project (IGPP) space strategy.
7. The creation of NA-00 has altered ownership of the budget and reporting (B&R) codes and the programmatic responsibilities within NNSA for F&I sustainment and investment.

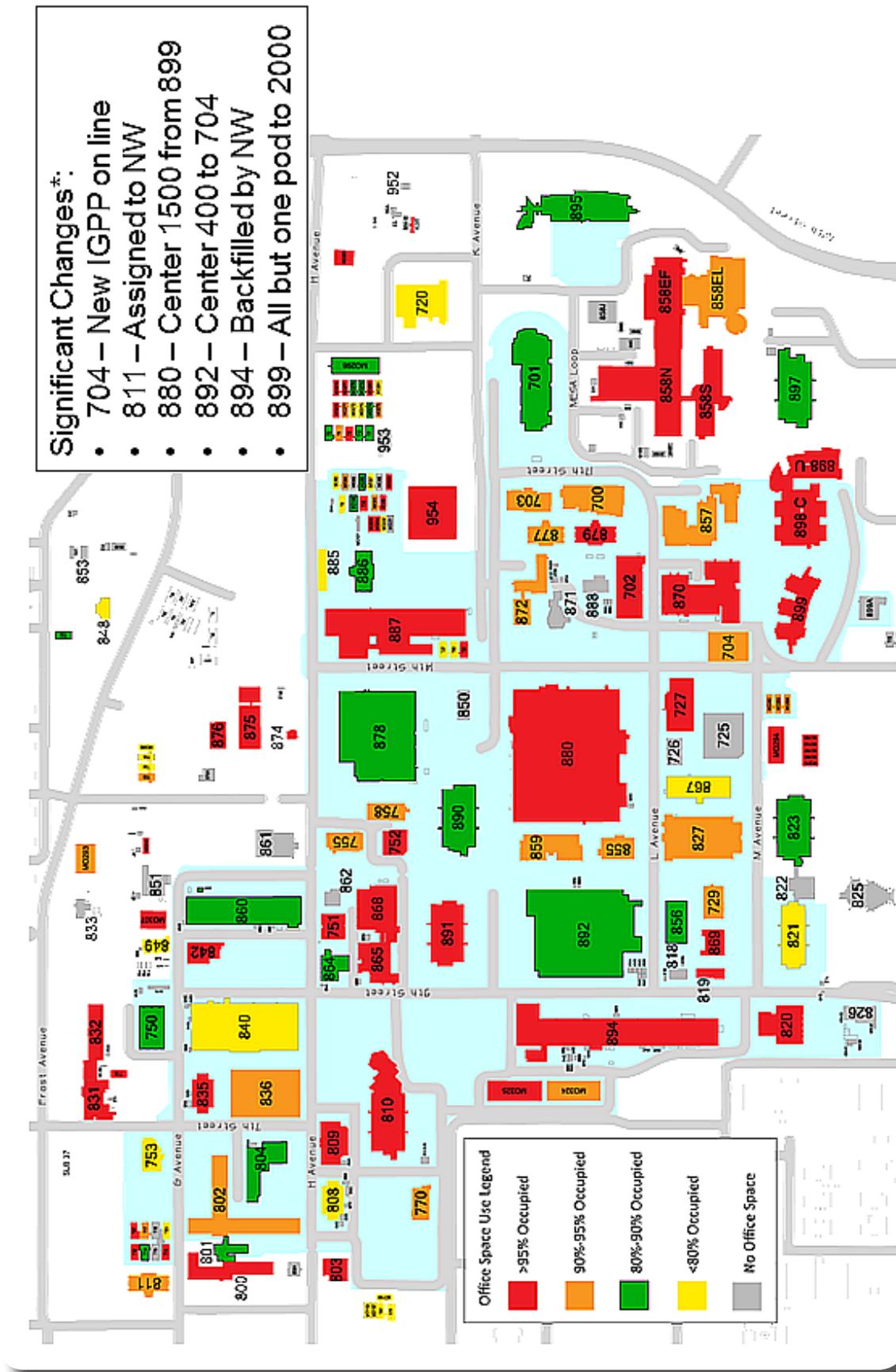


Figure 4.2 SNL/NM TA-1 Occupancy Projections–August 2013

## 5.0 Future Vision and Core Capabilities

Sandia realizes our nation's security depends not only on its NW stockpile but also its energy and infrastructure assurance, nonproliferation and assessment, control of and defense against weapons of mass destruction (WMD); and other defense and intelligence activities. Developing these missions in one multisite laboratory has produced an integrated network of capabilities and matrixing of personnel who share knowledge and scientific insights between the NNSA, DOE, and their IAW partners.

Sandia's long-term objectives reflect its philosophy of developing applications of new knowledge and its intent to make increasingly greater contributions to the nation, now and in the future. Committed to "science with the mission in mind," Sandia creates innovative, science-based systems-engineering solutions that achieve the following:

- Sustain, a safe, secure, and effective nuclear arsenal.
- Maintain strategic deterrence and stability at reduced nuclear force levels.
- Strengthen regional deterrence and reassure U.S. allies and partners.
- Prevent nuclear proliferation and nuclear terrorism.
- Support U.S. leadership in science and technology.
- Drive an effective and integrated NSE.
- Protect our national infrastructure.
- Ensure stable sources of energy and other critical resources.

Figure 5.1 provides an overview of Sandia's research and development (R&D) foundation.

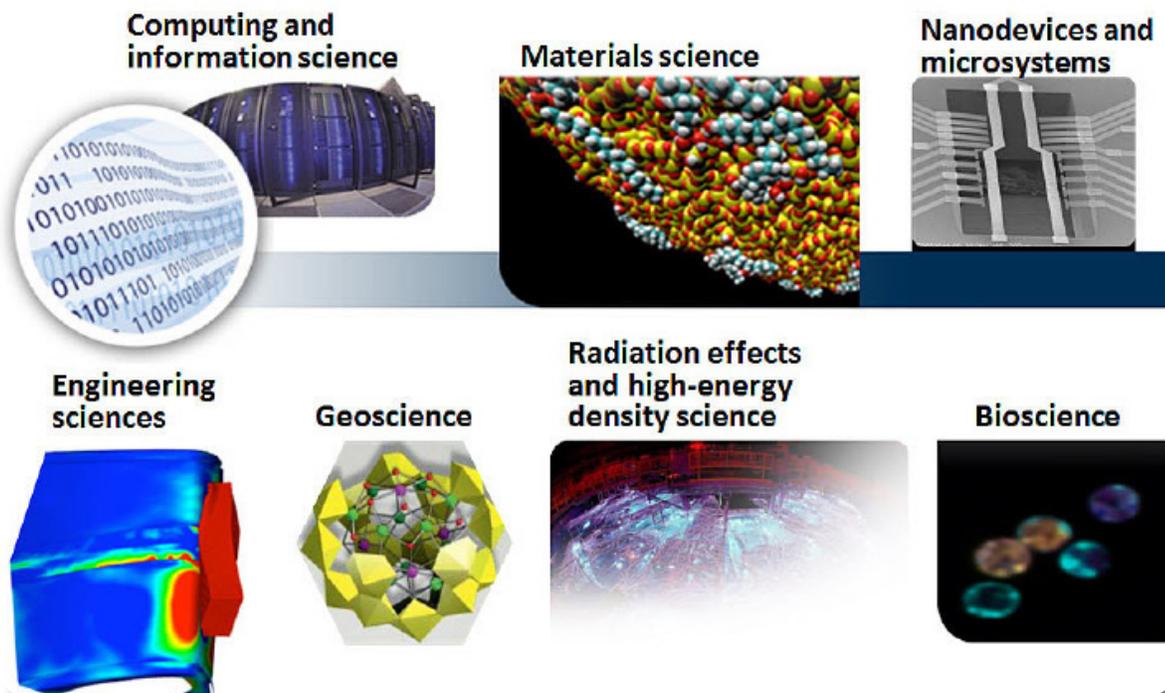


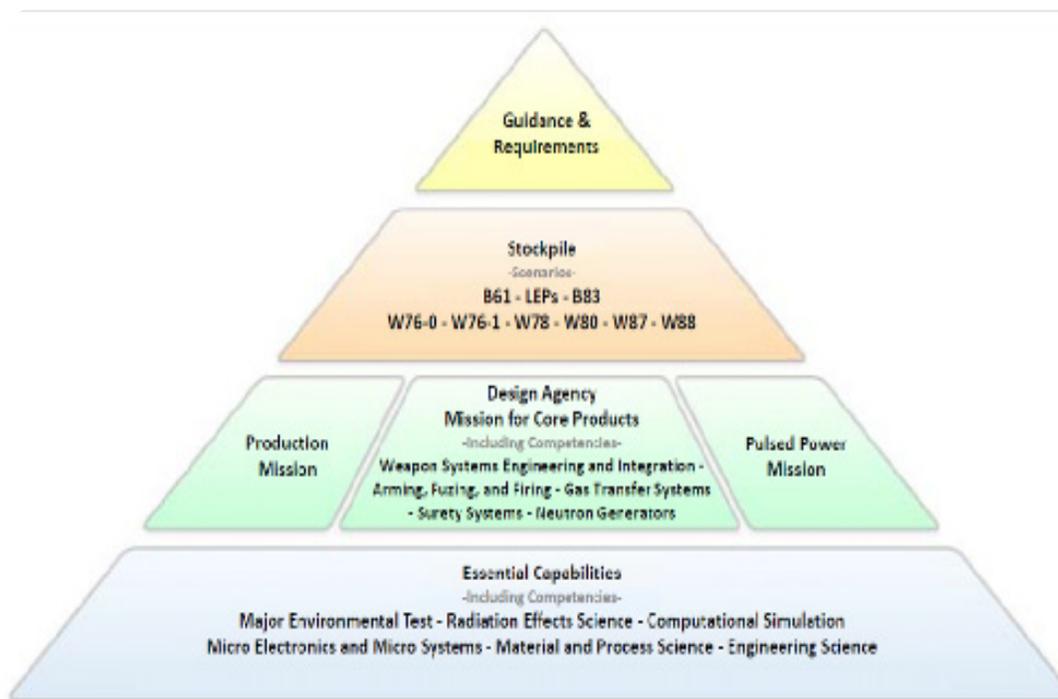
Figure 5.1 Sandia's Research and Development Foundation

Although the focus of Sandia’s mission remains national security, Sandia recognizes that the definition of “national security” is changing and will become increasingly comprehensive. As a formally designated Federally Funded Research and Development Center, Sandia provides engineering and science for the security of the nation and implements its diverse programs through its SMUs.

The NNSA accomplishes its mission to manage worldwide nuclear threats by helping to ensure the U.S. maintains a safe, secure, effective, and reliable NW stockpile and deterrent. Similarly, NNSA assists in reducing worldwide threats by helping to prevent the proliferation of WMD. Sandia supports both aspects of NNSA’s principal mission. Because Sandia’s customers also include the DOE; other federal agencies; state, local, and foreign governments; industry; and universities, Sandia’s strategic and budgetary plans include all constituencies consistent with its mission assignments and technology base. Sandia is a diverse multiprogram laboratory whose objectives, goals, and FY milestones represent major efforts and activities rather than individual programs. The remainder of this section will provide an overview of SNL’s F&I vision and plans utilizing the “core capabilities” identified in Table 2.3, page 10.

## 5.1 Design, Certification, Testing, Experiments, Surveillance, and Science, Technology, and Engineering Base

Since SNL’s founding more than 60 years ago, NW work has defined Sandia. Figure 5.2 represents Sandia’s NW SMU Integrated Planning Framework.



*Figure 5.2 NW SMU Integrated Planning Framework*

These “essential capabilities” represent the Science, Technology, and Engineering (STE) base that supports design, development, production, qualification, surveillance, assessment, and certification necessary for the sustainment and modernization of the stockpile. Sandia is NNSA’s designated Center of Excellence for Major Environmental Testing.

NW surety (systems performance, reliability, safety, and security) is a key mission assignment for Sandia and integral to Sandia's role in transforming the NW stockpile. Sandia continues to pursue a long-term strategy to consolidate common, collaborative program and technical work; for NW mission work, the consolidation will occur around the MESA complex. Sandia intends to utilize the MESA complex as an engineering magnet for consolidating NW operations.

In recent years, two significant capital investment LIs have been implemented, consistent with the consolidation of environmental testing activities: the Ion Beam Laboratory, completed at the end of FY 2011, and the Test Capabilities Revitalization project, Phase II, scheduled for completion in FY 2014, components of which are shown in Figure 5.3.



*Figure 5.3 Test Capabilities Revitalization, Phase II*

Over the next ten years the F&I supporting these capabilities will require the revitalization of SNL's normal/abnormal environment testing capabilities, improved and expanded information technology (IT) and information management (IM) support, microsystems development and fabrication, testing range maintenance, and additional high-bay and storage space along with a continued aggressive maintenance program.

F&I initiatives during the tactical planning horizon (next ten years) include the following:

**Tonopah Test Range (TTR) Revitalization:** Incremental investment intended to sustain and update the core real property assets aligned with the increasing NW mission work at TTR.

**IGPP Strategy:** Construct three IGPP office/light laboratory facilities in TA-I using corporate indirect funding to provide support for the decommissioning of Building 892 until WEF is operational. After that, these buildings will serve as turnaround space for a series of major renovation projects intended to extend the lives of a number of existing major structures in TA-I. Also, construct a single IGPP office/light laboratory facility at SNL/CA to facilitate renovation of major buildings on the California campus.

**Primary Standards Laboratory (PSL):** Execute critical recapitalization projects in support of the PSL mission in TA-I.

**TA-III Classified Solid Waste Landfill:** Complete the characterization, assessment, development, and implementation of a long-term remediation solution for this legacy NW issue.

**Buildings C910, C912, and C914 Renovation:** Execute a series of renovation projects to revitalize and extend the service lives of these two SNL/CA facilities (Figure 5.4).



*Figure 5.4 SNL/CA Buildings C912 and C910*



**Building 6588 Annular Core Research Reactor (ACRR) Refurbishments:** Replace aging programmatic equipment, safety-critical systems, and recapitalize basic facility backbone through a series of projects (Figure 5.5).

**Sandia Research Reactor Facility:** Replace the facility housing the ACRR with a modern facility, significantly reducing the risk to reactor capability for testing in experimental environments that are critical to the development, qualification, and assessment of the stockpile to meet military hostile and fratricide operational requirement.

**Mission Support Science and Technology Laboratory:** Integrate existing and emerging science and technology with Directed Stockpile Work by providing materials science research in the areas of gas transfer systems, surety core products, power systems, and stockpile materials.



*Figure 5.5 Annular Core Research Reactor (ACRR)*

The following F&I initiatives are included within the strategic planning horizon (FY 2024 to FY 2038):

**Gravity Weapons Certification:** Replaces core facilities at TTR that are rapidly eclipsing their service lives and preserves the location's unique testing and certification capabilities.

**Robust Secure Communication Laboratory:** Provides an expanded, novel, and integrated research facility for robust and secure communication development and testing using advanced labs designed to offer disruptive testing, jamming, and harsh or hostile environments.

**Consolidated Environmental Test Facility:** Upgrade, modernize, and consolidate environmental testing capability at SNL/NM in support of LEP activities and limited-life components associated with the enduring stockpile.

## 5.2 High Explosives

The Explosives Technology Group (ETG) has mission leadership responsibility (cradle-to-grave) for non-nuclear explosive components that are used within current NW stockpile systems and planned for future LEPs. Fundamental to meeting this mission assignment is sustainment and growth of Sandia's advanced high explosives (HE) and energetic materials R&D core capability and competencies.

NNSA's planned LEPs have increased the demand for advanced technologies in the near term that will meet new requirements for enhanced safety, reliability, and performance of SNL's non-nuclear explosive components and subassemblies. This demand requires that Sandia continue to explore the science basis behind its designs and components requiring the ETG to expand its R&D capability by investing in additional personnel and infrastructure.

The ETG has already begun to increase its science and engineering staff, pushing its office and laboratory occupancy and utilization beyond capacity. The organization is expecting continued growth with an additional 44 technical and support personnel by the end of FY 2014, requiring new building construction with additional supporting infrastructure. The ETG has expanded its remote explosive machining capability to include machining and fabrication of nonexplosive classified parts in support of explosive component design and development. This expanded scope will require additional space to house and operate these machines, which are currently in storage. One of ETG's facilities supports NW-based explosive R&D through performance testing. This facility has been identified as critical to support the LEPs and will require refurbishment of its underground test chamber.

An outgrowth of NNSA's investment in Sandia's HE and energetic materials R&D that addresses national security needs has resulted in growth in areas that include nuclear nonproliferation, counterterrorism, and emergency response. Future growth is expected in the area of developing the science and technology (S&T) base to respond to the threat of dispersal devices that couple explosives with biological, chemical, or radiation elements. This planned growth is consistent with the HE and energetic materials R&D core capability fundamental to the ETG and NW mission.

F&I initiatives during the next ten-year tactical planning horizon include the following:

**Building 905:** Office space and laboratory additions combined with renovation of existing space.

**Explosives Training Facilities:** Upgrade and renovation of existing training facilities on TA-III and the remote areas.

## 5.3 Non-Nuclear

Non-nuclear components of a weapon comprise three broad categories: mechanical, electrical, and energetic-material components. Examples of components in each of these categories include mechanical, such as safety mechanisms, strong links, and launch sensors; electrical, such as arming, fuzing, and firing components, including radiation-hardened integrated circuits and transistors; and energetic components, such as neutron generators (NGs), thermal batteries, detonators, ignitors, actuators, spin rocket motors, and impact fuzes. In each of these component categories, major changes are occurring in both their manufacturing processes and the materials used. The movement of many manufacturing companies overseas has affected the number of suppliers willing to undertake the manufacturing of these components, given the significant quality and low volume requirements for these parts. As commercial industry drives the technology of components, many of the legacy component manufacturing technologies and materials previously used to produce these components are being replaced or simply made obsolete. This causes programs requiring new or replacement components to identify new suppliers, train these new suppliers to operate to the necessary levels of quality required of NW components, and establish different or significantly modified manufacturing processes to realize these components. Furthermore, changes in production processes because of environmental regulations and concern about the health and safety of workers further alter the legacy manufacturing processes used for component production.

Given all these changes, it is essential the component designers adequately characterize and model component performance, materials, and production processes to ensure these new components meet stockpile requirements related to safety, security, longevity, and performance with adequate margin.

SNL is responsible for designing and developing many of the non-nuclear components that are external to the nuclear explosive package to support maintenance, life extension, and the safety, security, and use-control modernization of the stockpile. Production of these components is done in concert with the Kansas City Plant and SNL production facilities or is outsourced under the oversight of the responsible NNSA site. Sandia operates and maintains numerous facilities dedicated to the development, design, evaluation, qualification, certification, and surveillance of its non-nuclear components; however, Sandia also has and executes a production mission associated with radiation-hardened microelectronics and NGs.

The resulting overlap of both design and production deliverables across multiple systems over the next several years has driven SNL to develop and deploy several formal systems to ensure the most efficient allocation of resources for product development and physical production. It is also important to note that the neutron generator design and production business models, in which a single organization is responsible for the entire product life-cycle for neutron generators, has been key to bringing the necessary resources to bear on design and production problems in an efficient manner via seamless integration of S&T, design, and production assets.

In conjunction with modernizing manufacturing capabilities, maintenance and recapitalization of other production and support activities across the NSE are essential. Recapitalization of major science and experimental facilities will be required both to qualify and certify LEPs without returning to underground testing and to support the surveillance program. Recapitalization of the equipment for microelectromechanical systems and radiation-hardened microelectronics must also take place within the next few years because the current generation of equipment can no longer be maintained. These components and this capability are vitally important to the LEPs and provide a degree of assurance of supply chain security that is not otherwise available.

The MESA complex (Figure 5.6) provides capabilities for the design, prototyping, and fabrication of trusted, radiation-hardened microelectronics and microsystems integral to NW performance. MESA also provides capabilities for S&T packages for national security partners that include the DoD, the intelligence community, and S&T programs in other government agencies. MESA leverages the trusted, radiation-hardened capabilities to address joint programs while remaining ready for LEPs and other NW mission requirements.



*Figure 5.6 View of the MESA Complex from the South*

Sandia recently completed a study to modernize the physical infrastructure of the MESA complex over the next 30+ years. This study determined that sustainment of the facilities would fall within one of four broad categories:

1. F&I rehabilitation programs that can be completed while the facility is occupied
2. Construction of new facilities to replace old facilities that have reached the end of their design life and cannot be renovated while in use
3. Major renovation or reconstruction requiring closure of the facility to complete the work
4. Repurposing a major facility for microelectronics or a new or emerging program or partnership

In addition to major capital investments in these four categories, a continual program of tooling investments is essential to keep the MESA complex current with developments in microelectronics technology. This annual investment would allow Sandia to leverage technology costs to keep its capabilities on the “trailing edge” of the industry.

Sandia’s neutron generator (NG)-production capability supports weapons systems for NW and other national security missions. Customer needs are met through integrated planning, lean manufacturing, testing, and certification of NGs. Sandia’s capability develops and maintains qualified product definition, supporting field products, and provides design support for products in or near production. Materials operations support production through purchase material engineering, materials planning, inventory management, and tooling design and development.

F&I initiatives of particular interest during the tactical planning horizon include the following:

**Weapons Engineering Facility (WEF):**

LI investment to enable weapon systems engineering, advanced power sources, and stockpile surveillance work to be consolidated into one modern facility. Currently WEF is being programmed to replace Buildings 809, 835, 836, 892, and 894.

**Sandia Silicon Fabrication Revitalization (SSiFR):**

Modifications to facilities and capital equipment to modernize and replace outdated fabrication processes in the MESA complex.

**Building 840 Renovation and Reuse:**

Modifications and occupancy construction for NW and IAW customers (Figure 5.7).

**Building 894 Sustainment:** Implement several modification projects to extend the useful life of Building 894 until WEF is ready for occupancy, at which time it will enter a final disposition phase.

**Battery Test Facility:** Provide a long-term testing facility for the power sources group to perform lithium battery testing and evaluation in TA-II.

**NG Program Recapitalization:** Execute critical recapitalization projects in support of the NG production mission in TA-I.



*Figure 5.7 Building 840*

F&I initiatives during the strategic planning horizon include the following:

**Rad-Hard Foundry:** LI investment that replaces Building 858N and sustains the microelectronics-trusted foundry capability in critical support of microsystems S&T for NNSA and IAW.

**Modern Threat Abeyance Center:** Focuses and consolidates the surety engineering mission at SNL/CA and its related R&D capabilities and supporting infrastructure.

## 5.4 Enabling Infrastructure

Ensuring core capabilities are able to perform at optimal levels requires a balanced, realistic strategy that addresses the F&I that support mission work across SNL operating locations. Often considered secondary to facilities in which mission work is performed, utilities and other support facilities are integral to and enable successful mission performance in mission critical space.

Much of Sandia's current work takes place in facilities and uses infrastructure originally built to support Cold War NW programs and are either at or nearing the end of their designed service lives of roughly 50 years. Future mission work will be defined by flexible, modular, system architectures that support the evolving nature of mission requirements and constrained funding.

In light of this fact, Sandia needs to upgrade and recapitalize existing enabling infrastructure to support current missions and provide for and anticipate future NW and IAW requirements. Programs like FIRP and Capability-Based Investments (CBIs), are vital to Sandia's success. The scattering of critical functions amongst many dispersed and deficient facilities results in inefficiencies in space utilization that impede NNSA's stated transformation goal of reducing the size and associated costs of the NSE. Sandia's vision for helping resolve this gap is fundamental to the planning principles identified earlier in this section through consolidation of mission work with facilities and enabling infrastructures providing similar capabilities and collaborative possibilities. Consistently applying and executing Sandia's planning principles over the foreseeable future would yield the following results:

- Reduced overall development, DM, and associated operating costs
- Improved efficiencies within and across missions
- Reduced NNSA footprint
- Improved sustainability in the siting, construction, and operation of facilities
- Enhanced work environment quality and experiences for the workforce

Many of Sandia's missions and associated programs are heavily dependent upon state-of-the-art IT and IM applications and capabilities. Most of these capabilities are well established at the Labs, although they require frequent updating and renewal to reflect the latest advances in IT/IM and requirements for increased responsiveness.

Programs that will require renewal of IT/IM infrastructure to avoid technological obsolescence include the following:

- High-speed computational R&D
- Modeling and simulation for weapons and nonweapons design and testing
- Advanced test capabilities for model validation and system certification
- Microsystems and related technology R&D, design, and applications
- Nanotechnology R&D, design, and applications
- Analysis of advanced materials properties and behavior
- High-energy density physics experimentation
- Enhanced surveillance and surety technologies
- Chemical and biological sensor detection for national security applications
- Engineering and technology solutions to security issues and threats

All these programs will require sustained investment and reinvestment in F&I and equipment to maintain the advanced R&D, design, and application of technology leadership Sandia has established. Further, high-speed, secure connectivity within and between SNL locations will be required to realize NSE transformation goals.

From an infrastructure perspective, communications technology is rapidly evolving to wireless and optical technologies that have already begun to supplant copper-based hard-wired technology and will eventually replace it as a standard in the workplace. This evolution will require an investment in core communications infrastructure to support and sustain future mission needs. Although it is difficult to predict the technologies of the future with precision, there will undoubtedly be new discoveries in Sandia's many fields of R&D that will necessitate an investment in enabling infrastructure to support their advancement.

F&I initiatives during the tactical planning horizon include the following:

**Emergency Operations and Response Center:** LI investment to enable Sandia to provide emergency-incident management from a modern facility that serves and supports both local and national response teams and promotes the protection and emergency response for Sandia assets from accident, attack, or natural phenomenon.

**Building 862 Upgrades:** Replace and upgrade SNL/NM's standby generator system and associated equipment.

**TA-IV District Chilled Water Loop:** Establishes a district chilled water system for TA-IV, which includes mission-critical facilities, that provides life-cycle cost savings through reduced energy consumption and operating cost avoidance associated with providing facility cooling "economies of scale."

**TA-II Multimodal Transportation Connector:** Creates a transportation connector between TA-I and TA-IV to accommodate pedestrian, bicycle, EZ-Go cart, and service vehicles.

**Storm Drainage and Sanitary Sewer Improvements:** Address and mitigate site-wide issues associated with excessive erosion and its damage to existing sewer lines.

**TA-II Modular Village:** This investment represents a creative and relatively low-cost solution to provide mission support space at the site so that current mission support space can be backfilled with mission-enabling activities. Additionally, the modular space in the village may provide temporary space for functions and groups where space is undergoing renovation and/or modification.

**LVOC Infrastructure Development:** Joint-lab initiative with Lawrence Livermore National Laboratory to plan and install utility infrastructure trunks, vehicle circulation, and site-development improvements to create a dynamic, open environment to facilitate broader partnerships and engagement with academic, industry, and international collaborators.

**Collaboration in Research and Engineering Advanced Technology and Education (CREATE):** Establishes a multipurpose hub for the LVOC with a multipartner academic alliance, administrative and badging offices, library, and café combined with collaborative workspace for unclassified energy and cyber security programs (Figure 5.8).

**Corporate Records Storage Modular Facility:** Provides approximately 14,500 GSF of records storage space that meets National Archives requirements.

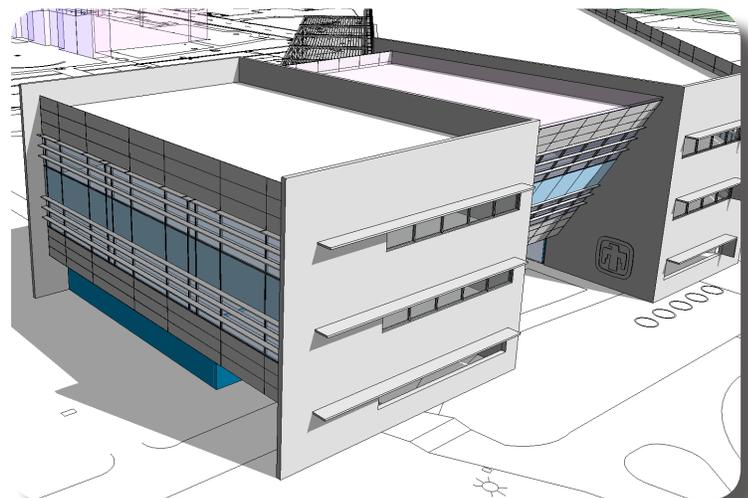


Figure 5.8 CREATE Conceptual Image

F&I initiatives during the strategic planning horizon include the following:

**Telecommunications Utility Refurbishment:** Replaces the existing underground, copper-cabling communications system with a fiber-optic backbone throughout TAs II, III, IV, and V; and the remote areas.

#### **TA-III, TA-V, and Remote Sites**

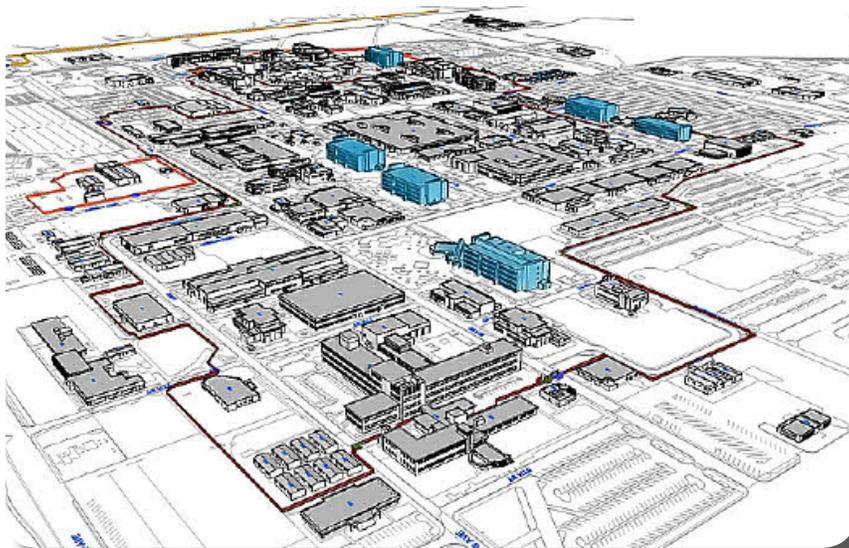
**Renovations:** Remote facility modifications, to maintain strong engineering testing capabilities including nuclear reactor, pressure, and solar-energy testing.

#### **Reshaping the NNSA Security Perimeter:**

Moves the current limited area and Kirtland Air Force Base boundaries to improve opportunities for site development with higher security in select areas and reduce Sandia's overall security footprint, enhance collaboration opportunities, improve vehicular access, and extend sustainable site development.

#### **Multistory Building "Clone"**

**Recapitalization Program:** This effort represents the renovation and enhancements to the multistory light lab/office buildings (nine total located in TA-I, TA-IV, and SNL/CA) that represent significant assets at SNL. Renovation of these assets will provide improved facilities and infrastructure for a variety of mission-enabling capabilities and represents the most likely scenario to provide up-to-date light lab and office functions in a constrained funding environment (Figure 5.9).



*Figure 5.9 Six "Clone" Buildings in SNL/NM TA-I*

## 5.5 Counterterrorism and Counterproliferation

For nearly 50 years the NNSA Office of Nonproliferation R&D (NA-22) and its predecessors have been supporting the nation's nuclear proliferation detection and nuclear detonation-detection missions. Throughout this period Sandia has played significant roles in advanced R&D to meet the evolving mission requirements from multiple stakeholders in the Department of State (DOS), DoD, and DOE, along with other federal agencies. Although the technological advancements span a wide variety of environments, none has been more enduring than the space-based assets. Beginning in the 1960s, Sandia has designed, developed, and supported the launch of more than 100 payloads into space for national security and scientific missions with many more planned for the near future.

As stated in NNSA's goals, objectives, and requirements planning for the satellite program, it is imperative for the national laboratories to provide technical leadership and leverage their collective S&T heritage, experience and expertise, and F&I for future space-related mission support. As is also true for the NW programs and LEPs in particular, product-realization processes in support of the satellite programs are conducted in buildings that are more than 40 years old and at capacity for this type of work.

New threats and direct attacks on U.S. space-based assets are a serious concern. In order to anticipate and adapt to these threats, NNSA needs to modify the technology and operational posture of its future space programs. Sandia is proposing the planning, design, and construction of a modern facility to promote and conduct the required technologically advancing work. In addition to the global burst detector (GBD) payloads, future missions will include the development of new NNSA R&D and demonstration/validation payloads, collaboration with other federal agencies, and rapid development and deployment of small space payloads.

The International Programs Building (IPB), leased space in Sandia Science and Technology Park, is a key asset in Sandia's work on international nonproliferation and cooperative threat reduction initiatives. As Sandia's programs in this field grow, with increased support from the U.S. DOS, the IPB allows Sandia to house and communicate with individuals from all over the world, especially sensitive countries. This facility provides secure access to the Sandia Restricted Network while also allowing visitors and staff to use open networks and communication for large and small meetings (Figure 5.10).

The Nuclear Incident Response Program at SNL supports the NNSA's Accident Response Group (ARG) and the arming and firing element of the Joint Tactical Operations Team (JTOT). Both the ARG and JTOT access and leverage Sandia's NW expertise and capabilities in its planning, provisioning, and training to respond to NW- and WMD-related accidents and acts of terrorism. Currently, the ARG and JTOT rely on system engineers and specialists from SNL NW programs to ensure the viability of their respective programs.



Figure 5.10 International Programs Building

F&I initiatives of particular interest include pursuit of the **Nonproliferation Research and Development** investment required to consolidate activities, provide modern production space, and support operational and technologically required change. The **Physical Security Campus of the Future** and the **Nonproliferation Science and Engineering Center** investments will consolidate Sandia's physical security and nonproliferation activities, including threat analysis, hardware for detection and monitoring systems, software for data analysis and generation of information for decision-making, and systems integration.

## 5.6 Support of Other Mission and Program Capabilities

Sandia provides engineering and design support for the NNSA Office of Secure Transportation (NA-15/OST) with its underlying "mission to provide a capability for the safe and secure transport of nuclear warheads, components, and materials that will meet projected DOE, DoD, and other customer requirements."

As the design agent for OST, Sandia supports the program through risk assessment, vulnerabilities characterization, engineering design development, and demonstration of innovative solutions for cyber, physical, and communications safety and security in a high-consequence mission environment.

Investments in supporting F&I will be required to prepare for the anticipated changes in workflow associated with this technological advancement. As a result of Sandia's recognized expertise in support of OST and secure transportation technologies, several opportunities within the NSE and transportation initiatives within the federal government are being pursued and developed.

As previously discussed, SNL F&I support NW, other NNSA, other DOE, and several non-DOE programs, making SNL a true multiprogram national laboratory focused on national security. In FY 2012, half of Sandia's operating funds came from non-NW activities with programmatic growth, evolution, and diversification expected across all SNL SMUs.

Sandia will continue to support counterterrorism, homeland security, and non-nuclear DoD initiatives by making the interchange of capabilities and expertise between the NSE and partners in the DoD, Department of Homeland Security,

intelligence agencies, and law-enforcement communities to further national security mission work. Such synergistic work strengthens Sandia's capabilities and makes cost-effective use of existing federal investments at SNL's locations.

The capabilities developed through these non-NW activities have established expertise not found in industry or other government agencies. These opportunities to contribute technological solutions to agencies other than DOE/NNSA help to solve national security needs in addition to helping maintain Sandia's abilities to perform and further NNSA missions. Sandia's DSA, Energy, Climate, and Infrastructure Security (ECIS), and International, Homeland, and Nuclear Security (IHNS) SMUs will continue to respond to increased federal, state, and local government-agency interest in homeland defense-related applications for Sandia's security and surety technologies and systems. These initiatives cover their F&I costs through corporate site-support charges assessed to the funding programs. It is notable that all SNL organizations, including those that support IAW programs, pay space-chargeback fees based on the space they occupy. Space-chargeback fees are intended to recover the cost of landlord services such as F&I maintenance and utility consumption. Sandia continues to examine current methods of cost-sharing and is looking for opportunities to improve full-cost recovery and transfer of landlord responsibilities where appropriate.

IAW is critical to SNL's vitality, synergy, and national security diversity; however, there is a higher degree of funding uncertainty associated with many of these programs, which has implications for planning and resultant project execution. The underlying relationships associated with non-NW work require the resources (people and facilities) to apply to a changing environment and flexibility for both NNSA and other mission work. Sandia executive management is continuing to pursue opportunities to build these relationships in accordance with the NSE's complex transformation.

Sandia and NNSA will continue working together to explore and develop improved approaches for federal oversight of facilities and operations in support of SNL's total mission. F&I initiatives during the tactical planning horizon (next ten years) include the following:

**Building C905, Combustion Research Facility:**

Several facility modifications, including seismic upgrades (Figure 5.11).

**DoD/DOE Energy Surety Engineering Research and Technology Complex:**

Complete energy laboratories that use Sandia's capabilities in surety, reliability, and complex systems integration with a vision to solve difficult energy problems, conduct leading-edge research, and provide agile experimental facilities that can adapt to future problem solving.

**National Cyber Security Facility:**

LI investment to develop and provide a Sensitive Compartmented Information Facility (SCIF) with high-performance computing capability.

**SCIF Spaces:** A number of facility modifications to provide SCIF space to existing buildings at multiple locations.

**Building 895 Office/Staging/Storage Addition:** Add on to Building 895 to optimize the use of the high bay laboratories for robotic and physical security systems development.



*Figure 5.11 SNL/CA Building C905*

## 6.0 Real Property Asset Management

Evolving missions, growing technology commercialization, newly emerging public-private partnerships, and new safety and security considerations are occurring at a time of constrained capital for space and infrastructure improvements. Integrated land use/facilities planning has become critical in light of DOE and NNSA policy and development considerations related to future site operations and future development of the nation's NSE in recognition of limited funding for capital improvements. Strategic planning assumptions derived from SNL, DOE, and NNSA planning documents continue to provide a basis to identify the relationship between programmatic needs and the impacts on physical infrastructure and facilities. As a result, Sandia has developed the following two strategic planning principles that guide future site development:

- Preserve the investment in the current campuses while transforming them for new and expanding missions in a sustainable manner; optimization of land use and minimization of the overall development footprint for efficiency, cost savings, and environmental purposes.
- Locate new development where it is supported most advantageously by current or new infrastructure; greater utilization of the campuses' land resources by intensifying development through infill development, use of space between existing structures for new structures or programmed activities, and consideration of multistory megastructures.

These planning principles translate into the following three investment strategies that serve as the foundation for Sandia's tactical F&I planning and execution:

1. Renovate and reuse when possible.
2. Remove unneeded facilities from service.
3. Use capital investments in facility construction and building improvements.

### 6.1 Site Footprint: Current and Future

Table 6.1 provides a current overview of Sandia's facilities focusing on mission dependency, facility use, FCI, and Asset Utilization Index.

*Table 6.1 Overview by Mission Dependency and Facility Use*

		Replacement Plant Value (RPV)				\$5,432 Million
		Total Deferred Maintenance (DM)				\$527 Million
		Sitewide Facility Condition Index (FCI)				9.7%
		Facility Condition Index (B,T,& OSF) (FCI)	Asset Condition Index (B, T, & OSF) (ACI)	Asset Utilization Index (B & T) (AUI)	Number (B&T)	Thousands of Gross Square Feet (KGSF) (B&T)
Mission Dependency	Mission Critical	8.13%	91.87%	99.22%	41	1,386
	Mission Dependent	10.22%	89.78%	95.65%	219	4,388
	Not Mission Dependent	8.91%	91.09%	94.20%	494	1,446
Facility Use	Office	8.73%	91.27%	96.21%	228	2,028
	Warehouse	8.29%	91.71%	90.82%	176	346
	Laboratory	9.91%	90.09%	96.17%	348	4,836
	Housing	0.00%	100.00%	100.00%	2	10

B = Building, T=Trailer, OSF= Other Structures and Facilities

Sandia's FYP addresses short-term, required investments and includes efforts to increase productivity, reduce long-term operational costs, reduce energy intensity, and demonstrate a fiscally responsible approach to ensure adequate cost control for customers. Sandia established the following objectives to guide its planning and prioritization:

- Remove or remodel substandard space.
- Improve productivity of mission through collocation and improvements to space quality.
- Explore the feasibility of nontraditional funding strategies such as third-party financing.
- Improve FCI by reducing DM.
- Increase space utilization (e.g., office, laboratories, and storage).

Sandia is currently experiencing growth in terms of funding and required staffing for both its NW-related work associated with the B61-12 and W88 ALT and several of its IAW programs. This increase has placed considerable pressure on already constricted amounts of available office and laboratory space. Using internally generated funds from its mission work, Sandia has initiated the construction of several IGPPs and maintain capabilities to support the NW LEP efforts, other national security programs, and mission-support work through the end of the decade. Figure 6.1 presents Sandia's anticipated change in its overall site footprint, which remains flat over the planning horizon.

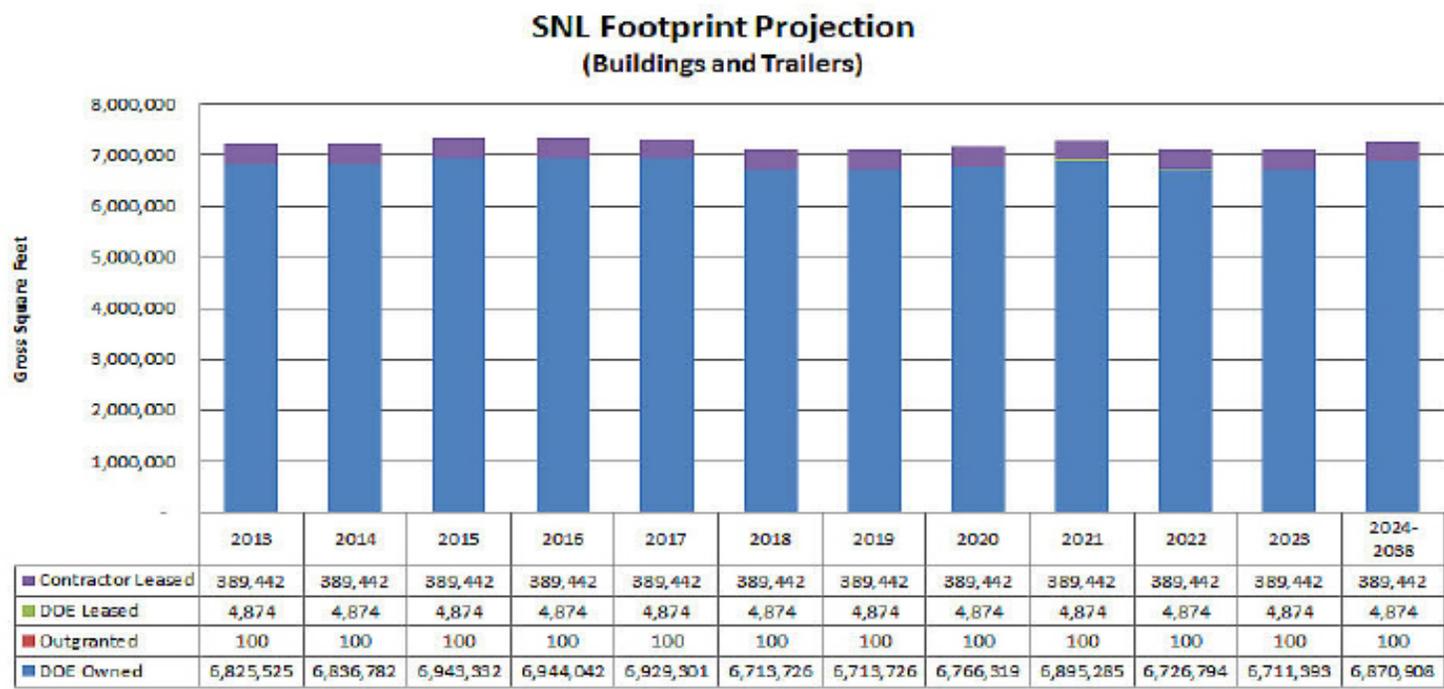


Figure 6.1 SNL Projected Footprint

Sandia's D&D management efforts focus on identifying space and structures that have become functionally obsolete or can no longer efficiently/effectively support mission requirements. Once identified, these real property assets (RPAs) are then slated for formal disposition in accordance with DOE guidance. Final disposition through demolition is dependent on the availability of funding.

If required investment and D&D funding is available, and to eliminate substandard space, consolidate missions, and provide “banked space” for new construction, Sandia plans to dispose of the following major real property assets within the next decade:

- Mt. Haleakala Remote Communication Facility
- Select facilities at KTF and TTR (see Figure 6.2)
- MO324 and MO325
- Building C927 (Figure 6.3)
- Building 867 (Figure 6.4)
- Building 868
- Building 892
- Building 894



*Figure 6.2 Tonopah Test Range*



*Figure 6.3 SNL/CA Building C927*



*Figure 6.4 Building 867*

The demand for modern technical space is presenting a challenge for SNL F&I. Numerous facilities at all SNL locations require concentrated maintenance attention and major renovation in order to provide infrastructure capability to support the mission work in a responsive time frame. Many buildings throughout SNL are at capacity and approaching the end of their planned service lives. Figures 6.5 and 6.6 provide a building age overview for SNL/NM TA-I and SNL/CA, respectively.

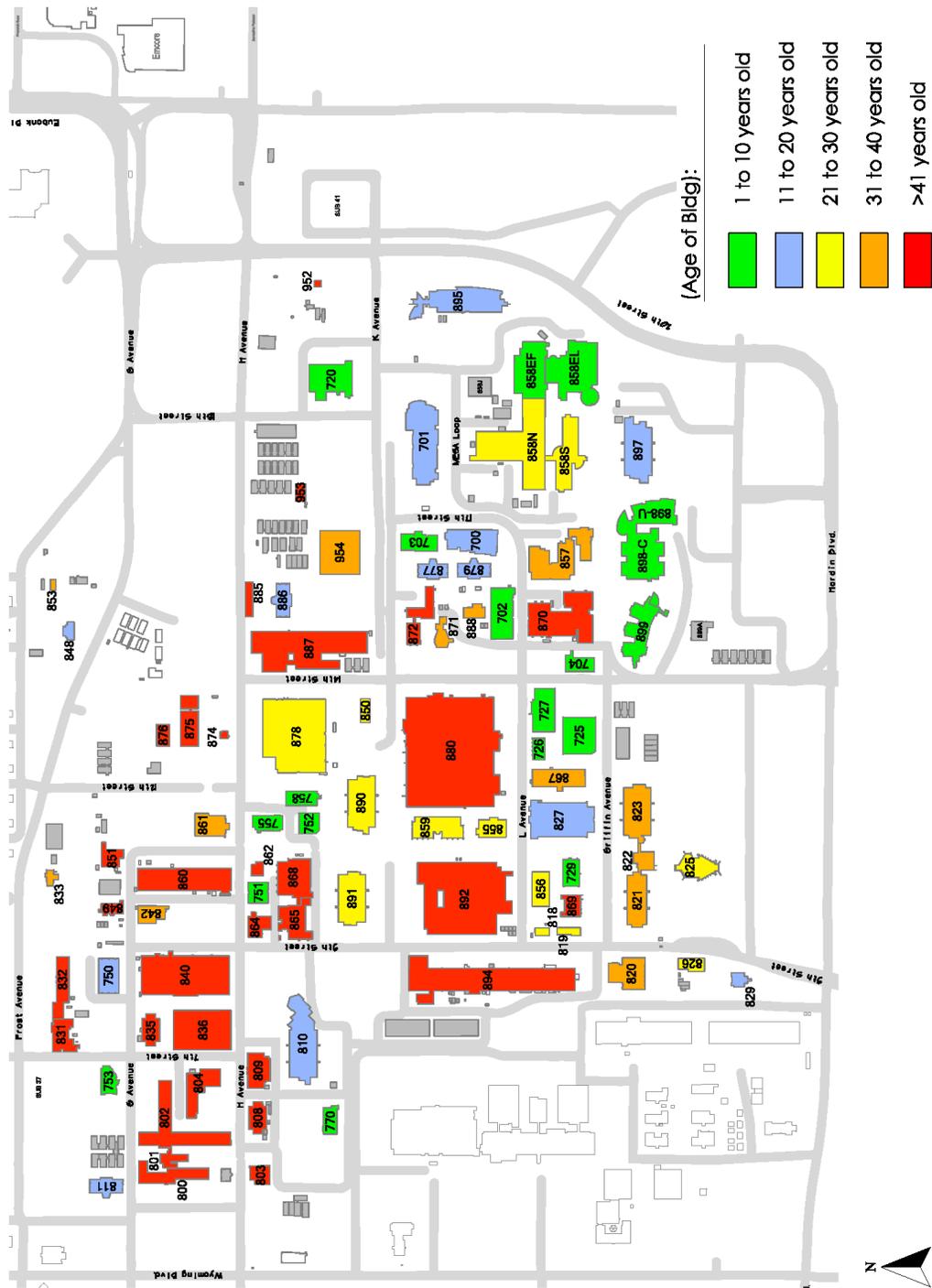


Figure 6.5 SNL/NM TA-I Building Age Overview as of FY 2013

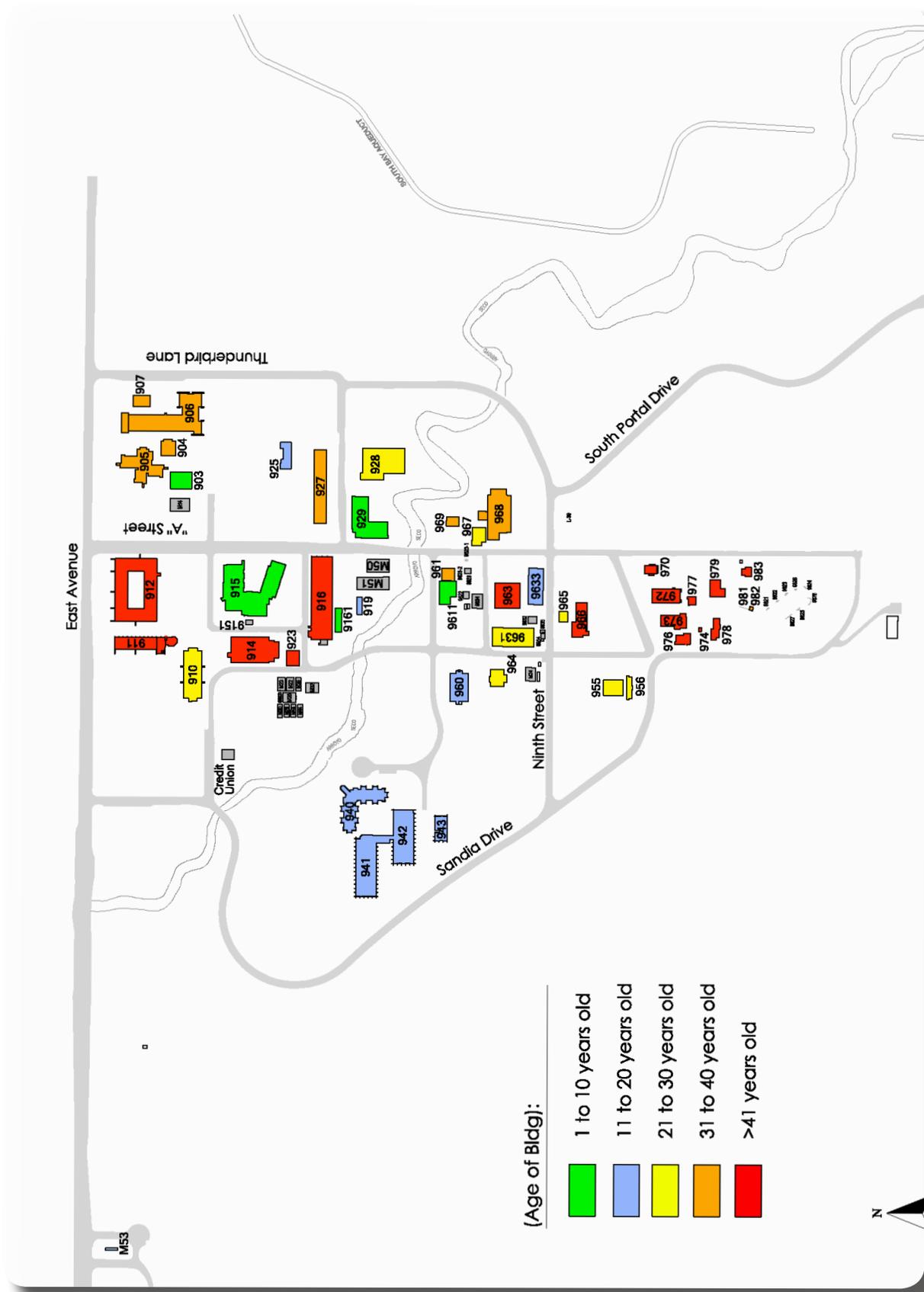


Figure 6.6 SNL/CA Campus Building Age Overview as of FY 2013

## 6.2 Facility Condition and Deferred Maintenance Reduction

SNL physical infrastructure is managed by the Facilities Management and Operations Center (FMOC) using an approach that identifies key F&I and then focuses resources on the most critical systems and equipment in a prioritized manner. The maintenance management program at SNL establishes activities, processes, and associated performance measures to ensure DOE/NNSA property is maintained in a “fit-for-mission-use” condition that promotes operational safety, worker health, environmental compliance, property preservation, facility performance, and overall cost effectiveness. This is accomplished through comprehensive CAS, targeted funding of projects to reduce DM, proactive (preventive and predictive) and reliability-centered maintenance, and a work control system. The maintenance of programmatic property and capital equipment at SNL is the responsibility of the line organization.

Sandia’s methodology for conducting CAS has undergone a major restructure in the last two years to ensure that it is better aligned with requirements and expectations in DOE Order 430.1B, and more accurately represents the condition of our F&I. The new CAS program utilizes a graded approach, based on a systems methodology. Condition assessments at SNL consist of a physical inspection of each real property asset (RPA) using a graded approach based on asset type, size, and mission dependency, and follow the Uniformat II methodology. The graded approach involves two types of inspections: single-rating and building-system-item (BSI). The single-rating inspection is for smaller, less-complicated buildings not deemed mission-critical; infrastructure assets; and other structures and facilities (OSFs). In the single-rating method the condition of the RPA receives one rating based on the 1-to-5 scale. In the BSI inspection method the RPA is divided into nine separate subsystems, each rated individually. The BSI method is used for larger, more complicated buildings and for mission-critical buildings regardless of size. Currently, 89% of SNL’s RPAs have been evaluated using the new system.

FCI targets and DM reduction are considered in the prioritization and scheduling of maintenance and projects. DM growth and reduction estimates for future years are based on projected deficiencies, projected funding, and historical averages. DM reduction is accomplished through four activities:

- Expenditure of the corrective, preventive, and predictive maintenance budgets and performance of associated work
- Disposition and elimination of substandard and excess F&I
- Completion of capital projects including LIs, general plant projects (GPPs), and IGPPs
- Completion of operating-funded initiatives including maintenance and repair, alterations, and betterments not meeting the capitalization criteria

FCI and DM calculations and projections have increased in the past year due to three factors:

- Implementation of the new CAS program, as described above
- Updates to some of the RPV models for key assets, such as our radiation facilities, due to a change in mission function
- Changes to DOE mandated site factors, a variable in the RPV algorithm

The combination of these three factors has increased DM, FCI, and RPV, resulting in a new baseline for each of these metrics. Figure 6.7 presents Sandia’s projected DM and resulting FCI by mission dependency. FY 2012 data is identical to the information reported in the Facilities Information Management System (FIMS) snapshot and represents the previous CAS methodology. FY 2013 data includes the changes noted above, and is consistent with current FIMS information. This 25-year projection is based on historical trends and will be revised in the coming months to include the new CAS methodology. With the improved CAS method and current constraints such as limitations in footprint growth and reduced budget for capital investment DM buy-down (i.e., FIRP) and D&D, Sandia expects DM and FCI to increase in the near term.

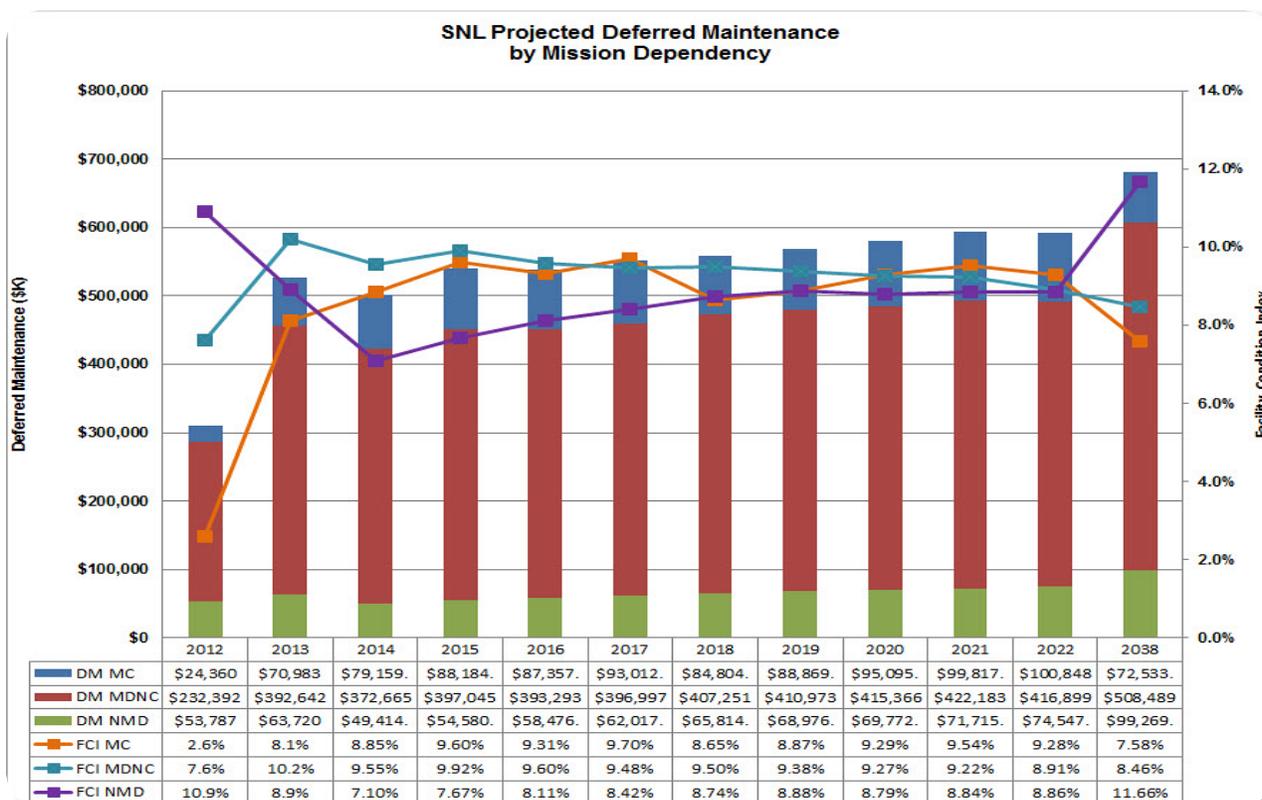


Figure 6.7 SNL Projected DM and FCI by Mission Dependency

### 6.3 Space Utilization and Consolidation

Over the planning period, Sandia anticipates that LI, GPP, and IGPP investments will add new space; the D&D program will remove substandard space; and Sandia will continue to lease appropriate amounts of offsite space to support its missions. FMOE works with the leaders of Sandia’s SMUs, divisions, and center representatives to understand mission capability needs and assess space requirements. The primary goal is to develop strategic space plans to best accommodate growth, consolidation, and relocation while ensuring appropriate use of existing space, maintaining space, and developing opportunities to eliminate substandard space.

Sandia continues to analyze opportunities and will develop strategies to resolve current and future gaps in space needs. All options are reviewed and evaluated based on criteria such as cost to the government (initial and life-cycle), effectiveness in supporting mission requirements, and longevity of solution. These evaluations include developing a business case to ensure that the space-acquisition costs are equal to or less than other options, or that they generate revenues to offset any cost increases. Other criteria include space availability, funding availability, compatibility with Sandia’s planning principles, compatibility with DOE/NNSA space-offset requirements, and flexibility for future use.

Sandia currently leases space at several locations including Albuquerque and Carlsbad, New Mexico; Washington, D.C.; Alaska; California; and Minnesota. Most lease space is primarily acquired on a short-term basis and each lease is evaluated based on need and space-availability criteria for the amount of space requested. Onsite leased space at SNL/ NM includes mobile offices (MOs) and office space in TA-I, TA-III, the Burn Site, and office and workshop space in TA-IV. Various off-site leases in the Sandia Science and Technology Park include the Innovation Parkway Office Center, IPB, Computational Sciences Research Institute, and the Cyber Engineering Research Laboratory. As consolidation efforts continue, new leased-space needs should diminish, although mission work often requires new space before long-term solutions or facilities can be provided. These needs must be promptly met for work to be accomplished.

## 6.4 Sustainability and Energy

The SNL *Site Sustainability Plan* (SSP) is prepared annually to support the *DOE Strategic Sustainability Performance Plan* (SSPP) and the NNSA sustainability goals and broader sustainability program. Accordingly, the content of the SSP covers the SNL contributions toward meeting the DOE sustainability goals cited in the DOE's SSPP, as well as the DOE requirement to comply with Executive Orders 13423 and 13514.

As stated in its FY 2013 SSP, Sandia's vision is to lead "the DOE complex, the nation, and the world in innovative, large-scale institutional transformation to a sustainable, carbon-neutral environment while increasing mission effectiveness, resource reliability, and resource security."

Sandia's SSP elaborates the proposed strategies for achieving SSPP sustainability goals by reducing its energy consumption, emission of greenhouse gases, and water usage through the following means:

- Reducing current demand; use less
- Delivering resources to mission-critical activities reliably and securely
- Eliminating current demand; turn off or remove
- Providing metering and control systems to track and trend performance
- Using resources efficiently; use fewer resources for the same task
- Showcasing SNL related R&D activities
- Managing future demand
- Promoting a sustainable business model
- Migrating to non-carbon-emitting energy sources
- Reduce transportation fossil-fuel use
- Improving partnerships with external resource providers and collaborators

Sandia's plan further recognizes that "effectively managing future demand is critical if Sandia is to meet its objectives. Sandia's first priorities are mission performance and effectiveness. Mission growth, with associated growth in energy and water use, is anticipated over the planning period. Planning for mission growth before it occurs and managing growth during program implementation will increase the probability of sustainability success."

## 6.5 Challenge and Opportunity

Substantial capital investments will be required to improve and modernize existing structures, recapitalize infrastructure, construct new facilities, and maintain/enhance security and safety for evolving and changing missions. A restrictive funding environment and further administrative requirements affecting site management provides SNL with a challenge to leverage investments to renew its major sites and provide the space and infrastructure required to maintain SNL's standard of excellence.

As resources and management options are constrained and funding for capital investments becomes more difficult to obtain, Sandia must analyze trade-offs to ensure that each new investment:

- Represents optimal long-term use of land and capital
- Provides the capacity and agility to meet current as well as future missions
- Maximizes efficiency/effectiveness and minimizes long-term operations and maintenance costs
- Contributes to a stronger and more vital intellectual and research community
- Enhances the quality of the environment and quality of life for those working at SNL
- Preserves and enhances the legacy of landscape and architecture
- Improves the synergy of campus and community

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