# Annual Infrastructure Executive Committee Report to the Laboratory Operations Board


8 September 2017

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# 1 Purpose

The Department of Energy (DOE) is responsible for a vast portfolio of world-leading scientific infrastructure and production assets and the general purpose infrastructure that enables the use and operation of those assets. With origins in the Manhattan Project, this portfolio has developed over the past 75 years, and now accounts for the fourth largest inventory of real property in the Federal Government by square footage. The DOE complex includes seventeen DOE National Laboratories, National Nuclear Security Administration (NNSA) plants, and Environmental Management (EM) cleanup sites that provide the foundation for the Department's ability to conduct its mission. The land, facilities, and other assets that comprise the complex represent one of America's premier assets for science, technology, innovation, and security.

## KEY INFRASTRUCTURE STATISTICS

9,445 buildings totaling 111.2 million square feet

Average facility age: 37 years

Average support structure age: 40 years (utilities, roads, bridges, etc.)

2.1 million acres

$125.6 billion Total Replacement Plant Value

$2.2 billion in annual operating and maintenance costs

$5.4 billion in deferred maintenance (operational facilities)

Source: 2016 Facility Information Management System snapshot for the EE, EM, FE, NE, NNSA, and SC Program Offices

While the Department has made significant investments in its world class experimental facilities to accommodate evolving science and technology mission needs, infrastructure continues to age and commands greater attention. DOE facilities currently have an average age of 37 years and the systems that support these facilities (water, sewage, electrical, paved areas, etc.) have an average age of 40 years. General purpose infrastructure – such as office space, general laboratory space, storage space, and utilities - enables the Department's mission and forms the backbone of the DOE enterprise. Modern, reliable infrastructure is critical to support DOE in successfully and efficiently executing its missions both now and in the future.

In 2013, the DOE formed the National Laboratory Operations Board (LOB) to provide an enterprise-wide forum for engaging DOE Laboratories and Program Secretarial Offices (PSOs) in a joint effort to identify opportunities to improve effectiveness and efficiency in the National Laboratory System. In 2014, the LOB established an integrated plan to conduct site-wide infrastructure assessments across all 17 National Laboratories as well as NNSA plants and

environmental management activities, for the first time using common standards and definitions. These assessments provided an unprecedented, uniform condition analysis of facilities and infrastructure systems across the complex. Based on this data, the Department faces a systemic challenge of degrading infrastructure with levels of deferred maintenance that continue to rise. This finding provided the basis for over $100 million requested and appropriated in FY 2016 for general purpose infrastructure investments. To build on the success of that effort, the Infrastructure Executive Committee (IEC) was established as a subgroup of the LOB to monitor the status of infrastructure investments and the Department's evolving infrastructure condition. The committee is comprised of line managers and facilities experts from across the DOE complex.

In FY 2016, the IEC was charged with providing annual updates to the LOB on the state of infrastructure. This report answers that charge, and is intended to present the Department with mature and accurate data to improve infrastructure stewardship by informing prioritized investments in infrastructure and enhancing real property management processes. The scope of this report covers the six DOE Program Offices that manage laboratory assets including the Office of Energy Efficiency and Renewable Energy (EE), Environmental Management (EM), Fossil Energy (FE), Nuclear Energy (NE), the National Nuclear Security Administration (NNSA), and the Office of Science (SC).

In the development of this report, the committee has coordinated efforts with the LOB, integrated with the Excess Contaminated Facilities Working Group (ECFWG), and partnered with the Office of Management to ensure consistent data reporting across multiple platforms. This is the second annual infrastructure update, prepared by the IEC, and presented to the LOB.

## 2 Background

When the Department established the LOB in 2013, DOE Laboratories and PSOs were engaged in a joint effort to identify opportunities to improve effectiveness and efficiency in the National Laboratory System. One of the transformational opportunities identified by the LOB was the need to focus on revitalizing infrastructure across the DOE enterprise to support current and future mission activities. Beginning in the fall of 2013 and under leadership of the LOB, the Department began focusing significant attention on improving its stewardship of infrastructure – specifically for assets such as utilities, general office buildings, and general laboratory spaces that are used on a broad basis to enable the mission of an entire plant, site, and laboratory. These efforts were developed and executed by DOE headquarters, site office, laboratory, and plant employees, in a complex-wide partnership.

Notable outcomes include:

- In 2014, the Department's process to assess the condition of its assets was overhauled to more directly reflect whether an asset is physically able to support its mission.
- Clear and consistent guidance for conducting condition assessments was developed through the LOB infrastructure process and issued across the Department; approximately 85% of DOE's infrastructure assets have been evaluated using this methodology.
- The Department established the IEC as a subgroup of the LOB. The IEC includes senior leadership from across the Department and is co-chaired by line programs on a one-year rotating basis. NNSA led the Committee in FY 2015, followed by the Office of Science in FY 2016. The Office of Nuclear Energy and the Office of Management are co-chairs of the Committee for FY 2017. The IEC is charged with preparing this report annually as well as presenting enterprise-wide, prioritized investments in infrastructure.
- As part of the FY 2017 Omnibus, NNSA received an additional $105 million for infrastructure investments on top of the President's request and full funding ($200 million) for disposition of the high-risk Kansas City Bannister Federal Complex.
- The Office of Science and NNSA led efforts to develop consistent reporting among DOE sites in accounting for repair needs and deferred maintenance – two measures that are important indicators of investment needs.
- NNSA has expanded its Asset Management Program, which uses supply chain management economies-of-scale to provide a more centralized and efficient procurement approach to replacing aging infrastructure systems that are common throughout the enterprise, such as roofs and HVAC systems.
- EM is pursuing coordination, analysis and concurrence of EM site submissions for infrastructure reporting, such as, the Integrated Facilities Infrastructure Crosscut Budget and five-year plans.
- Within individual program offices, infrastructure planning is now included as an integral component of the annual planning and evaluation process. This has enhanced integration of infrastructure and mission planning and raised the visibility of infrastructure and its mission impact. For example, building from the Office of Science planning model, NNSA is deploying its Master Asset Plan, which is a strategic, enterprise-wide, risk-informed, long-range view (25+ years) of NNSA infrastructure that will be updated on an annual basis.

## 3 Current State of Infrastructure

This annual report is structured around seven questions that help to assess the current state of DOE infrastructure and, going forward, the progress made in revitalizing that infrastructure.

1 Is the percentage of adequate facilities and other structures increasing?
2 Is deferred maintenance decreasing?
3 Is the square footage of underutilized space decreasing?
4 Are excess space/buildings being eliminated?
5 Are the costs of carrying excess facilities declining?
6 Did the Department make the investments in general purpose infrastructure that it committed to make?
7 Are fewer core capabilities at risk due to infrastructure deficiencies?

Many of the metrics discussed in this report will provide insight into infrastructure condition and management as year-over-year trends. The first annual report in 2016 established metrics to address the questions above consistently across the DOE enterprise. The focus of the second annual report is to analyze the quality of those metrics and examine any trends that are beginning to form.

## 3.1 Is the percentage of adequate facilities and other structures increasing?

In 2014, the LOB developed and issued consistent guidance for assessing the adequacy of assets in terms of both physical condition as well as functionality. Figure [1] shows the percentage of Departmental assets that have not yet undergone these LOB-directed condition assessments from FY 2014 to FY 2016. The percentages in Figure [1] include Buildings, Trailers, and OSFs and are evaluated based on the total Replacement Plant Value (RPV) these assets.

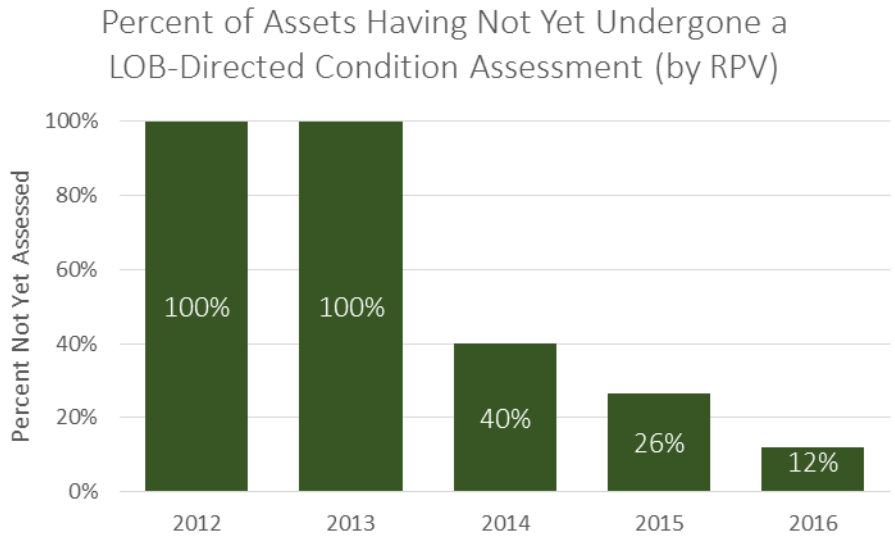


*Figure 1 - Percentage of Assets Not Yet Assessed for Condition*

The asset condition categories developed through the LOB assessment process are defined as:

Adequate: Fully capable of performing its current mission with only minor deficiencies that can be corrected within normal operating budgets.

Substandard: Deficiencies limit performance of the mission and refurbishment is required to return the asset to adequate condition.

Inadequate: Major deficiencies that significantly impair performance of the mission; major refurbishment is required.

Figure [2] shows the asset condition of DOE facilities at the end of FY 2016, with slightly more than half of DOE-owned buildings and trailers rated as adequate to meet the mission. Figure [3] shows the condition of the Department's core Other Structures and Facilities (OSFs). OSFs are supporting infrastructure assets not classifiable as buildings or trailers, such as utility systems, paved areas, towers, tanks, etc. The majority of OSF assets were rated at the end of FY 2016 as adequate to meet the mission. Figure [4] provides more detailed information regarding the current condition of several key OSF system types. Note that Figures 2 through 4 show percentages by assets' Replacement Plant Value (RPV).

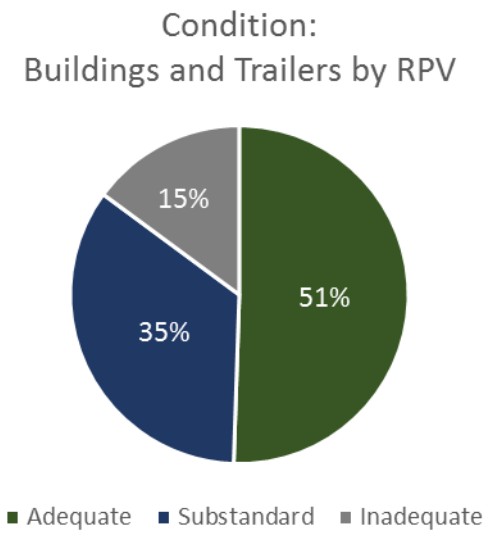


*Figure 2 – Condition: Buildings and Trailers*

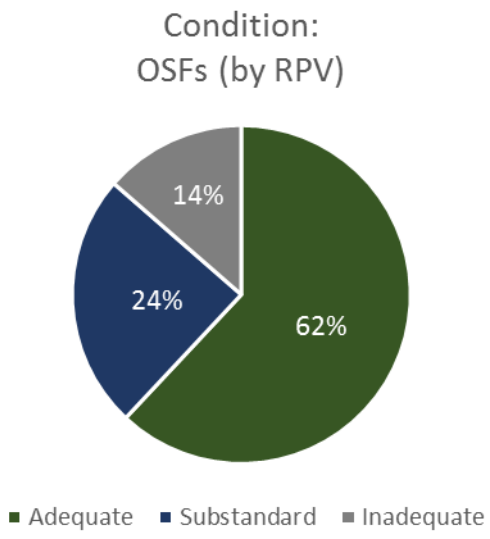


*Figure 3 – Condition: Non-Facility*

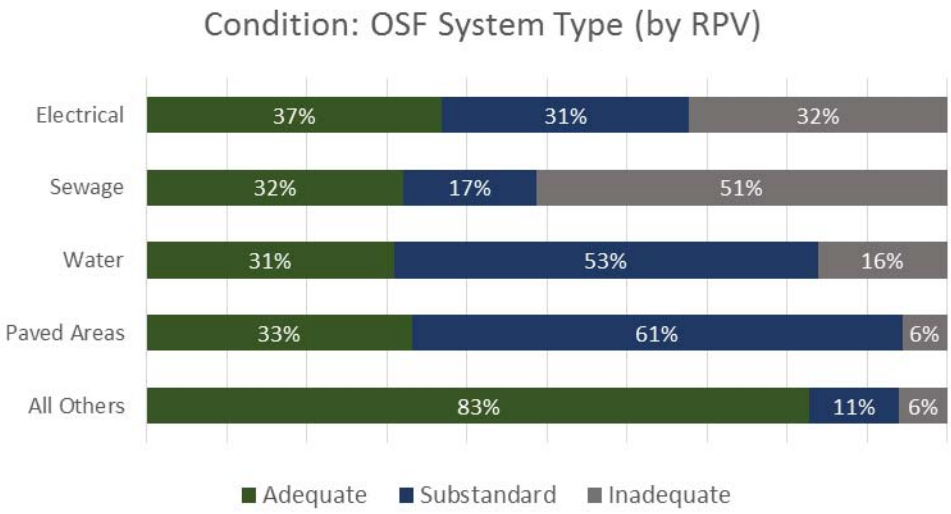


*Figure 4 – Condition: OSF System Types*

Next Steps

The Department is focused on improving the condition of its assets to meet mission needs and address potential risks to safety, security, and programmatic objectives.

In the near term, the DOE is focused on ensuring all of its facilities have undergone LOB-directed condition assessments to establish a solid baseline against which to measure future progress in improving asset condition. The DOE Financial Report identifies eight management priorities that represent the most important strategic management issues facing the Department. Infrastructure is among these eight priorities. To help promote progress and improvements in these priority areas, the Department has developed a set of Management Priority Goals. The Infrastructure goal is as follows:

In FY2017, decrease the percent of unassessed DOE Buildings, OSFs and Trailers by 5% below the 2016 baseline. In FY2018, decrease the percent by 5% below the FY2017 amount.

As Figure [1] indicates, about 12% of the Department's infrastructure covered in this report has yet to undergo an initial LOB-directed condition assessment. This number has steadily decreased each year since implementing this initiative in2014; it is heading in the right direction. However, since the number of assessed facilities continues to significantly change each year, the Department cannot yet establish a stable baseline from which to measure future progress in improving asset condition. Currently about 12% of assets remain to be assessed. Once that number drops below 5%, the DOE will consider the data set to be stable and will then establish

the baseline for measuring and trending changes in the portfolio's condition ratings (i.e. adequate, substandard, and inadequate).

## 3.2 Is deferred maintenance decreasing?

When necessary maintenance on a facility or utility system is scheduled or should be performed, and is postponed, it is referred to as deferred maintenance. Trends in deferred maintenance could indicate aging infrastructure and associated challenges, such as those relating to reliability, mission readiness, and health and safety. Figure [5] shows the deferred maintenance trend for the Department since FY 2012. Deferred maintenance for active, DOE-owned assets has increased more than 20% from $4.5 billion in FY 2012 to $5.5 billion in FY 2016.

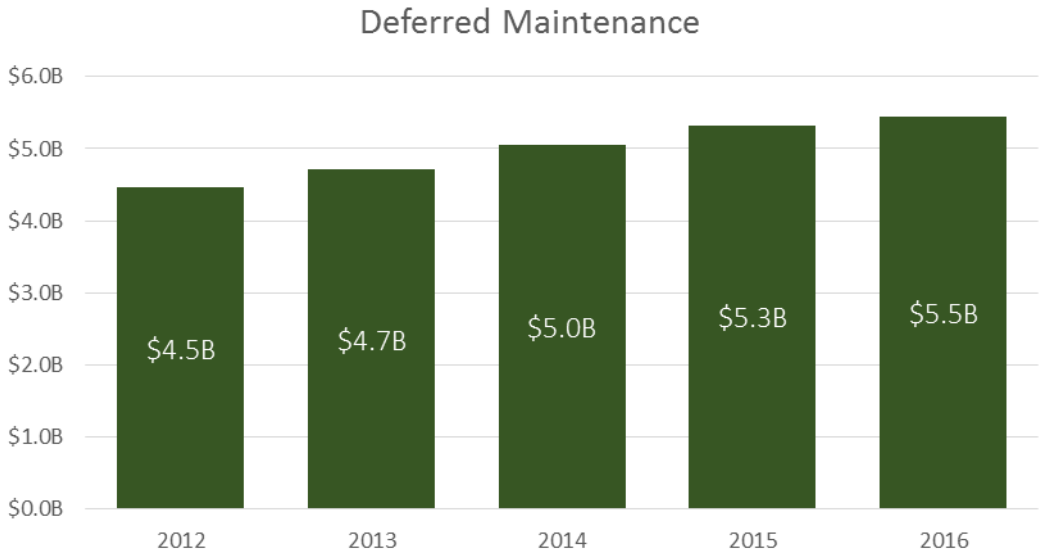


*Figure 5 – Deferred Maintenance*

Beginning in 2014, the DOE Office of the Chief Financial Officer (CFO), in coordination with the LOB and IEC infrastructure initiative, established deferred maintenance budget guidance targeted at the FY 2016 budget year and beyond. The guidance required DOE programs to fund their infrastructure and maintenance budgets at levels sufficient to halt the growth of the deferred maintenance backlog. Since FY 2016 is the first budget year for this effort, the effectiveness of any directed infrastructure investments will not be visible until FY 2017. In other words, projects funded in FY 2016 aimed at reducing DM backlog would be designed and implemented in the FY 2016-2017 timeframe and would, therefore, not be expected to show actual reductions in deferred maintenance until FY 2017 and beyond.

Next Steps

Moving forward, the IEC will continue to track annual trends in deferred maintenance to determine whether deferred maintenance growth has halted in FY 2017. If not, the IEC and LOB will coordinate with the CFO to determine opportunities for increasing emphasis on infrastructure budget planning focused on reducing deferred maintenance needs.

## 3.3 Is the square footage of underutilized space decreasing?

The Department is committed to maximizing the use of its space and assets. Identifying underutilized assets provides opportunities to identify ways to more fully utilize space or disposition assets and eliminate the need for resources to maintain those assets.

In addition to redefining asset condition, the LOB infrastructure assessment effort in 2014 also redefined metrics associated with space type and space utilization. These space types include Office space, Storage space, and Other space. Other space includes wet lab and dry lab space, power-intensive space (e.g. data centers, accelerators), and ventilation intensive space (e.g. positive or negative pressure cleanrooms). Table [A] provides a breakdown of how space utilization is defined for different space types.

| Utilization Rating | Office | Storage | Other |
|---|---|---|---|
| Over-utilized | > 95% | > 80% | > 85% |
| Fully Utilized | 75% - 95% | 50% - 80% | 60% - 85% |
| Under-utilized | < 75% | 10% - 50% | 30% - 60% |
| Not Utilized | | < 10% | < 30% |

*Table A – Utilization Definitions by Space Type*

The Department continues to make progress on identifying space type utilization across all of its assets. Since the number of assets undergoing space-type utilization assessments increases each year, the IEC is unable to evaluate year-to-year trends on a dataset that continues to significantly change. Figure [6] shows the breakdown of space utilization across all three space types at the end of FY 2016.

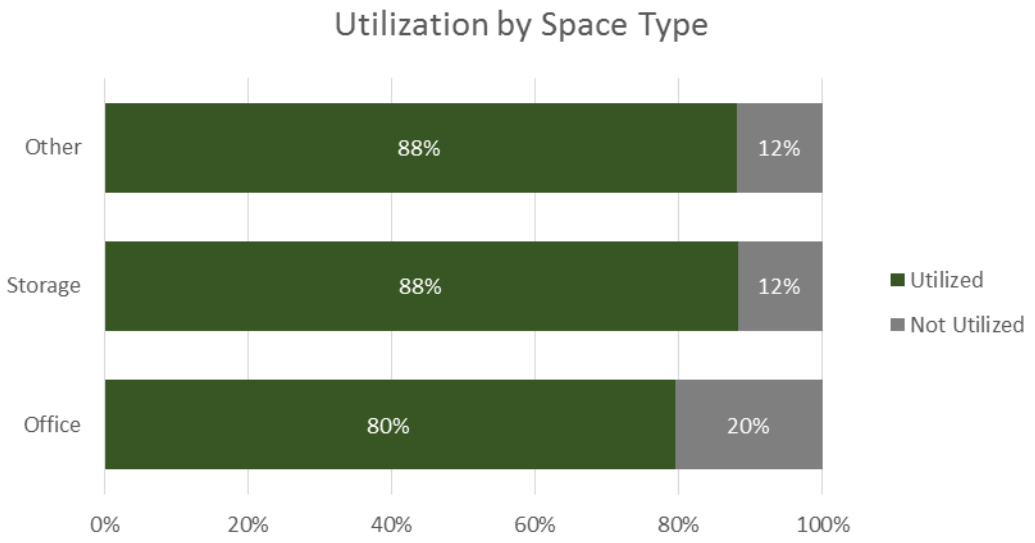


*Figure 6 – Utilization by Space Type*

At the end of FY 2016, Departmental Office space is currently categorized as fully-utilized, with room to grow, while Storage and Other space are over-utilized.

Next Steps

Moving forward, the IEC will continue to track the number of real property assets assessed for space-type utilization and the percentage of assets utilized and non-utilized for all three space types. Currently, the DOE has assessed about 64% of its active buildings and trailers (by gross square feet) to determine how much usable space they have in terms of the various space types. Once 95% of assets have been assessed for space-type utilization, and the data accurately represents the utilization of Department space, the IEC will begin tracking annual trends for space utilization. This data will be available for DOE to target investments to maximize the use of space, including reusing or repurposing infrastructure where possible to meet current mission needs.

## 3.4 Are excess space/buildings being eliminated?

In addition to its active infrastructure portfolio, DOE leads the largest nuclear cleanup effort in the world. DOE's objective is to remediate the environmental legacy of more than seven decades of government-sponsored nuclear energy research and nuclear weapons research, development, and production. The disposition of excess facilities is an important part of this cleanup mission. Since the Office of Environmental Management (EM) was established in 1989,

DOE's other Program Secretarial Offices (PSOs) have transferred thousands of excess facilities to EM for deactivation and decommissioning (D&D). EM has made substantial progress in D&D of these legacy excess facilities, having completed almost 3,000 facilities over the past 25 years.

Excess facilities, especially those that are process contaminated, are a drain on DOE's infrastructure resources, and can pose a risk to safety, security, and programmatic objectives. The Department faces a significant challenge with the number of aging excess facilities throughout the complex and the limited resources to deactivate, decontaminate, decommission, and demolish those facilities in the near term. Disposition of process contaminated facilities is the responsibility of EM. However, until EM is able to accept such facilities, stewardship (management, surveillance, and maintenance) responsibilities are retained with the owning PSO. In addition, each PSO is responsible for D&D of all excess facilities in its portfolio that are not process contaminated.

DOE's disposition priorities are to stabilize higher-risk facilities, characterize their hazards and conditions, remove hazardous materials, place them in the lowest risk condition possible, and ultimately eliminate the risk by demolishing the facility and disposing of the resulting waste. However, because of competing regulatory and other compliance obligations and performance challenges in some areas, EM is unable to D&D all of the excess facilities already transferred from other programs at this time.

In 2015, the LOB established an Excess Contaminated Facilities Working Group (ECFWG) to explore issues and develop options for disposition of DOE's excess facilities. The working group collected enterprise-wide data to develop a qualitative assessment of potential risks and to obtain updated rough order of magnitude (ROM) cost estimates to deactivate, decontaminate, decommission, and demolish excess facilities. The ECFWG used this data to define the scope of the challenge and to suggest risk-informed approaches for addressing DOE's contaminated excess facilities in their Plan for Deactivation and Decommissioning of Nonoperational Defense Nuclear Facilities Report to Congress in December 2016. The ECFWG will issue this report every two years, in response to a requirement of the 2016 National Defense Authorization Act, as DOE continues to address the challenges of managing excess contaminated facilities.

The IEC has integrated efforts with the ECFWG to assess whether excess facilities are being eliminated and to ensure the accuracy of reporting data across multiple platforms. As of the end of FY 2016, DOE has over 2,400 excess facilities. Figure [7] reflects excess facilities across the Department, broken out by the number of facilities that each PSO is currently responsible for.

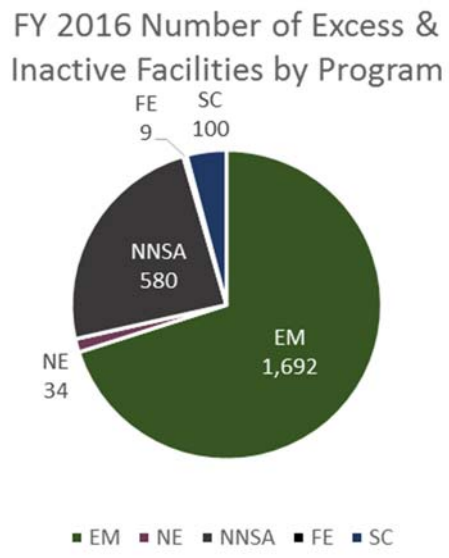


*Figure 7 – FY 2016 Number of Excess & Inactive Facilities by Program*

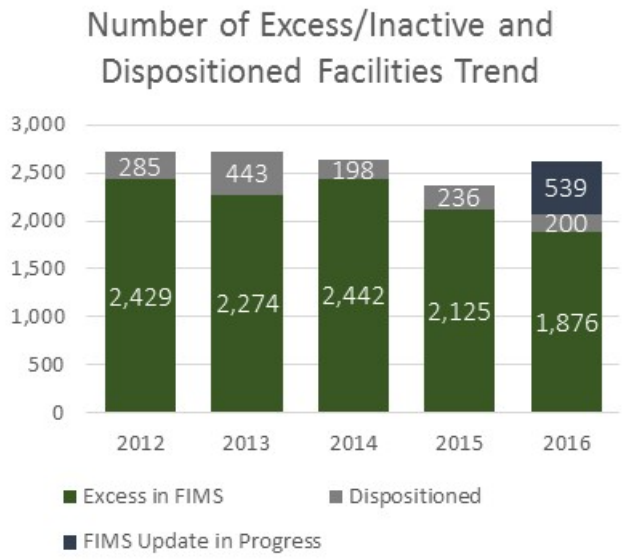


*Figure 8 – Excess and Inactive Facilities Trend*

Figure [8] shows the trend of excess and inactive facilities within the Department including the number of facilities dispositioned during the last five fiscal years. In total, DOE dispositioned 1,362 real property assets from FY 2012 to FY 2016 through demolition, sale, transfer, or lease cancellation. Additionally, Figure 8 also includes 539 assets at the Portsmouth and Paducah sites that were recently transferred to EM, yet remain to be updated in the DOE Facilities Information Management System (FIMS) to reflect their excess property status. Without taking into account the recently transferred facilities to EM, it is apparent that overall the number of DOE excess facilities is decreasing through the disposition of excess facilities. However, as DOE continues to modernize and streamline our enterprise infrastructure, the number of excess and inactive facilities will increase as facilities are shut down and then decrease as facilities are disposed.

Next Steps

The IEC will continue to integrate efforts with the ECFWG to accurately report excess assets across multiple DOE documents. Once EM is able to update the FIMS database to reflect the status of its recently acquired excess assets, the IEC will set a baseline and will then begin to analyze year-over-year trends. This data will be available to inform DOE in the process of improving enterprise-wide assessment, planning, and prioritization of excess facilities in order to address the potential risks these excess facilities pose to DOE's mission, workers, the public, and the environment.

## 3.5 Are the carrying costs of excess facilities declining?

The information gathered as part of the ECFWG efforts included ROM costs for D&D; cost ranges for maintenance, surveillance, repairs, and operations (MSRO); and an assessment of potential risk to public health and the environment, worker safety, and mission.

As a general matter, for higher risk excess facilities, MSRO costs can run into the millions of dollars per year to keep the facilities safe and stable. These costs are terminated when a facility is demolished. In addition to incurring ongoing MSRO costs, delaying D&D may:

- Expose individuals and the environment to increasing levels of risk;
- Escalate disposition costs. An example of this is the D&D of the K-25 building at Oak Ridge, which cost substantially more due to degradation that took place over a number of years prior to D&D; and
- Impede ongoing mission work (such as excess facilities located near ongoing mission work) as well as plans and space to accommodate new missions.

For the purpose of this report, MSRO costs for excess facilities are best captured as carrying costs, which are organized into two categories: Annual Actual Maintenance (AAM) and Operations (OPS). AAM includes preventive maintenance and repairs. Sites identify AAM costs on an asset by asset level, providing a good indication of true carrying costs for excess facilities. OPS costs however, are generally tracked at the Site level (not asset level). OPS costs include electricity, water, sewer, gas, cooling, heating, pest control, snow removal, trash removal, janitorial services, and grounds maintenance. Sites typically allocate those costs across all assets based on factors such as asset size and/or operating hours. Since OPS costs are not specifically tracked at the asset level, they may not provide a completely accurate picture of such costs for excess assets alone. Therefore, it may be beneficial to consider the OPS costs reported here as an upward limit. Actual OPS carrying costs may be somewhat lower. Figure [9] exhibits the breakdown of FY 2016 Carrying Costs for excess facilities.

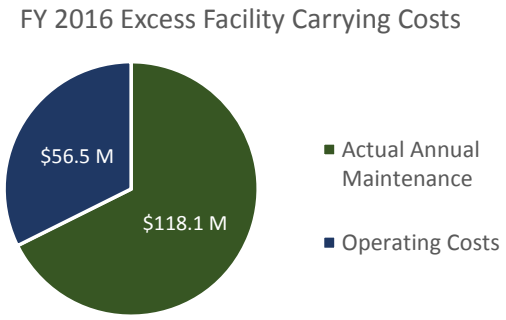


*Figure 9 – FY 2016 Carrying Costs for Excess Facilities*

As mentioned in the previous section, EM recently took possession of over five hundred excess facilities at the Portsmouth and Paducah sites and is currently working to update the FIMS

database to accurately reflect those assets. As a result, the numbers in the chart above are of an incomplete dataset and are best evaluated as estimates only. EM plans to continue updating the FIMS database during the remainder of FY 2017 in close coordination with the IEC and the ECFWG.

Next Steps

The IEC will continue to integrate efforts with the ECFWG and determine when this dataset has reached a level of maturity such that it can be analyzed for year-over-year trends. The annual trend data will then be available to inform DOE in the process of improving enterprise-wide assessment, planning, and prioritization of excess facilities in order to address the potential risks these excess facilities pose to DOE's mission, workers, the public, and the environment.

## 3.6 Did the Department make the investments it committed to make?

To help evaluate the state of infrastructure, the IEC tracks what investments have been made to maintain and improve that infrastructure. Over the past five years (from FY 2012 – FY 2016), more than $8.5 billion has been invested in infrastructure, either directly by the Department or indirectly through laboratory overhead. Investments in this area have steadily increased, rising by nearly 75% over this five year period (Figure [10]).

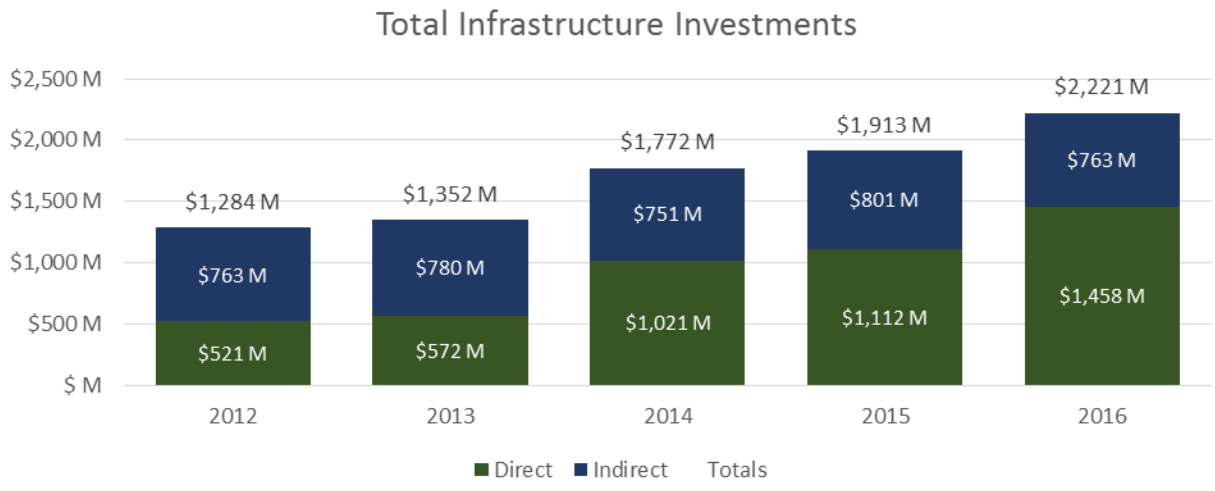


*Figure 10 – Total Infrastructure Investments*

Managing DOE infrastructure is a partnership between the federal line programs that steward a laboratory or site (e.g. NNSA, EM, NE, the Office of Science) and the individual plants, sites, and

laboratories. Figure [10] demonstrates this partnership, showing that infrastructure investments are a mix of direct-funded and indirect-funded activities, averaging 55% direct and 45% indirect when aggregated over the past five years.

Direct-Funded Investments

The direct-funded infrastructure investments include:

- Line item projects, which are capital improvements greater than $10M;
- General Plant Projects (GPPs), which are capital improvements less than $10M;
- Excess Facilities Disposition Projects;
- Maintenance and Repair activities.

Figure [11] shows that direct investments in infrastructure have steadily increased over the past five years.

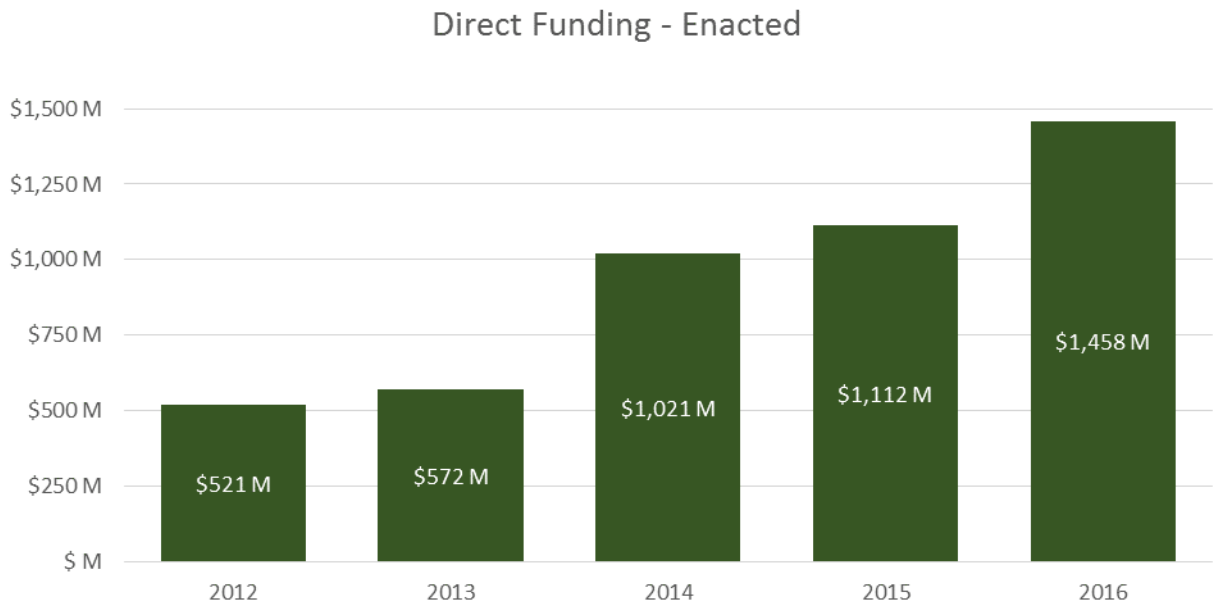


*Figure 11 – Direct Funding - Enacted*

The significant increase in investments for FY 2016 is a result of LOB efforts to identify and prioritize investments in critical infrastructure projects, following the condition assessments initiated in FY 2014. Table [B] below shows some of the work supported by the FY 2016 appropriations to target critical infrastructure projects.

| Funding ($M) | Work Scope | Status |
|---|---|---|
| $9.4 | Replace failing Heating, Ventilation, and Air Conditioning (HVAC) systems at several facilities across Lawrence Livermore National Laboratory | In Progress FY 2018 completion |
| $2.7 | Renovate and replace equipment at Lawrence Livermore National Laboratory | In Progress FY 2018 completion |
| $7.9 | Replace critical mission equipment at the Kansas City Plant | In Progress FY 2017 completion |
| $0.5 | Upgrade safety systems at Los Alamos National Laboratory (LANL) | In Progress FY 2017 completion |
| $1.2 | Upgrade high explosives facilities at LANL for compliance and modernization | Complete |
| $2.0 | Upgrade electrical infrastructure systems at the Nevada Nuclear Security Site | Complete |
| $7.5 | Upgrade fire protection and other core infrastructure systems at the Nevada Nuclear Security Site | In Progress FY 2018 completion |
| $7.4 | Replace electrical and mechanical infrastructure at Pantex | In Progress FY 2017 completion |
| $1.9 | Replace glovebox oxygen monitors at the Savannah River Nuclear Security Site | In Progress FY 2017 completion |
| $7.3 | Replace failed dehumidification systems at Y12 | In Progress FY 2018 completion |
| $13.4 | Replace core electrical infrastructure at SLAC National Accelerator Laboratory and Argonne National Laboratory | In Progress |
| $9.0 | Renovate two floors of Wilson Hall at Fermi National Accelerator Laboratory | In Progress |
| $7.2 | Upgrade the Savannah River National Laboratory firewater system, and replace hot cell windows and associated electrical control systems | In Progress, estimated completion in FY 2019 |
| $23.2 | Upgrade utilities at Idaho National Laboratory, including power distribution infrastructure and control systems | In Progress, estimated completion in FY 2018 |
| $100.6 | Total | |

*Table B – FY 2016 Appropriations Targeting Critical Program Infrastructure*

Figure [12] shows enacted funding levels versus requested funding levels for the past five years.

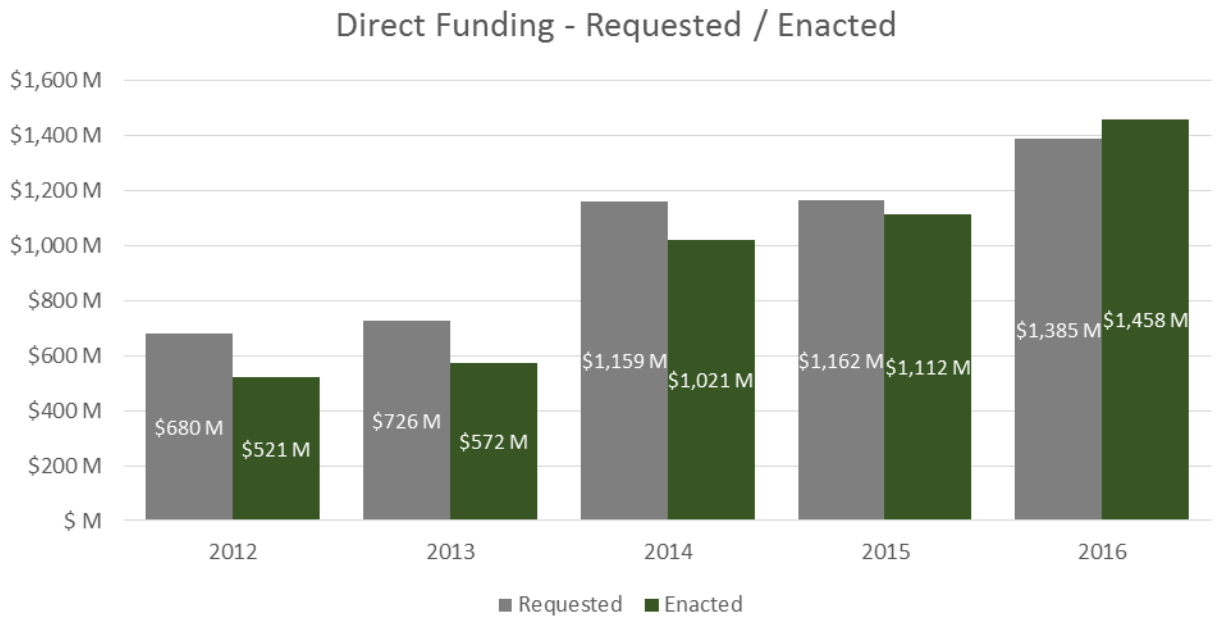


*Figure 12 – Direct Funding – Requested/Enacted*

Overall, Congress has appropriated more than 90% of the direct-funded investments the DOE requested for general purpose infrastructure since 2012.

Indirect-Funded Investments

Indirect-funded infrastructure investments include:

- Institutional GPP, which are capital improvements of less than $10M that are of general benefit across the site;
- Excess Facilities Disposition Projects that are funded by site overhead; and
- Maintenance and Repair funded by site overhead.

Figure [13] shows that indirect investments have remained relatively steady over the past 5 years. These investment levels are largely managed by the individual sites, and vary from program to program.

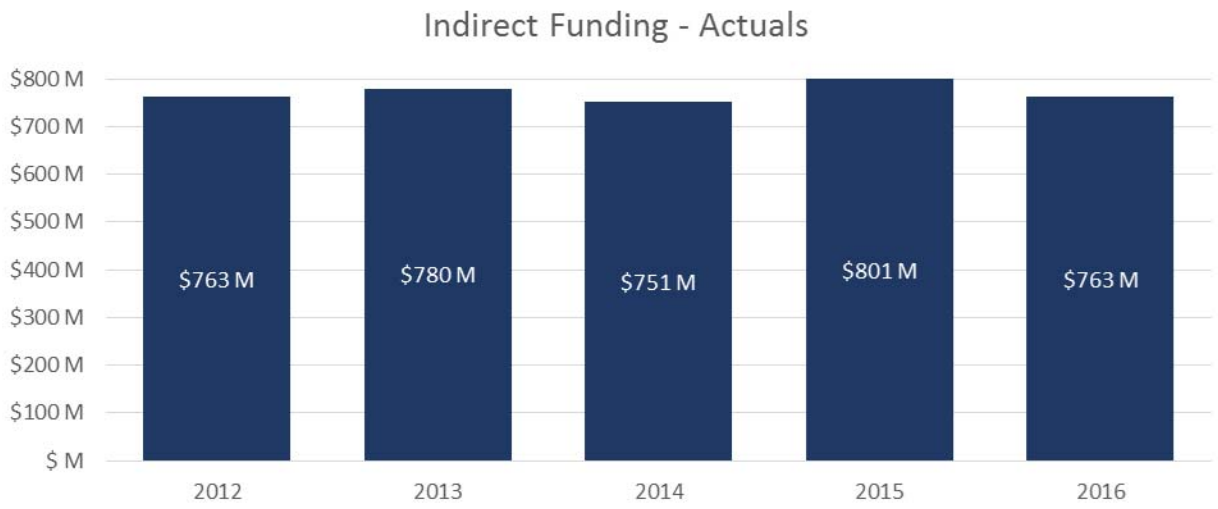


*Figure 13 – Indirect Funding - Actuals*

Next Steps

The IEC will continue to track investments the Department has committed to make, and analyze the effect of these investments on infrastructure.

## 3.7 Are fewer core capabilities at risk due to infrastructure deficiencies?

The IEC is focused on ensuring that infrastructure can continue to support each site's core capabilities and the Department's energy, environmental, and nuclear security mission needs. The data and metrics in this report provide insight into the general question of whether fewer of those core capabilities are at risk due to infrastructure deficiencies.

Quantitatively, core capabilities are a data field in FIMS. Each laboratory, plant, and cleanup site associates assets with core capabilities (where applicable), tying those assets to PSO and Departmental mission objectives. In FY 2017, the IEC initiated a pilot program with Idaho National Laboratory and Brookhaven National Laboratory to identify core capabilities at risk due to facility condition. This pilot initiative continues to evolve.

Next Steps

In future reports, the IEC will continue to evaluate methods for applying metrics to identify core capabilities at risk due to substandard or inadequate facility condition. The Department is committed to addressing the challenges posed by aging infrastructure to core capabilities and

mission objectives. This will include attention from senior leadership, with guidance by the LOB, and stewardship from the IEC. A safe, reliable, and modern infrastructure is vital to supporting the critical work of the Department and the success of its mission.

# 4 Path Forward

To sustain ongoing infrastructure improvements, the IEC plans to accomplish the following actions in FY 2018:

- Draft the third Annual Infrastructure Executive Committee Report to the Laboratory Operations Board, to be issued by the end of FY 2018.
- Present planned enterprise-wide investments in infrastructure to senior DOE leadership.
- Share new tools, best practices, and lessons learned on infrastructure program and risk management.
- Track the percentage of real property assets that have been assessed for condition until less than 5% remain unassessed. Once this threshold percentage is reached, track year-over-year trends for infrastructure condition to determine whether the percent of facilities and other structures rated as "adequate" is increasing.
- Evaluate year-over-year trends in deferred maintenance with the objective of determining whether the Department's focus on infrastructure investments is halting the growth of deferred maintenance.
- Track the percentage of real property assets that have been assessed for space utilization until 95% of assets have been assessed. Once this threshold percentage is reached, track year-over-year trends to determine if the percentage of underutilized and not utilized space is decreasing.
- Continue to integrate efforts with the ECFWG to assess whether excess space/buildings are being eliminated; assess whether the costs of carrying excess facilities are declining; and establish uniform measures and data validation in this area.
- Address in future reports whether fewer core capabilities are at risk due to infrastructure deficiencies.

# APPENDIX

## Data Source for Figures Presented in this Report

Unless otherwise noted, data source is FIMS Historical Report for 2016
Note all BLUE text in this Appendix represents the names of FIMS data elements

## Summary Table - DOE Owned Infrastructure

Number of Buildings
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Property Type = Building, Trailer

Acreage
- Acreage
- Ownership = DOE Owned (O), Withdrawn Land (W)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Property Type = Land

Square Feet
- Gross/Rentable Sqft
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Property Type = Building, Trailer

Replacement Plant Value
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC

Facility Age
- Year Built (if Year Built is blank, use Year Acquired)
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC

Operating and Maintenance Costs
- Annual Actual Maintenance
- Op Costs Total
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC

Support Structure Age
- Year Built (if Year Built is blank, use Year Acquired)
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Property Type = OSF

Deferred Maintenance
- Deferred Maintenance
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Status = Operating, Outgranted, Standby

## Figure [1] – Percentage of Assets Not Yet Assessed for Condition

Total RPV
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer, OSF

RPV Not Yet Assessed
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer, OSF
- Overall Asset Condition = (Blank)

## Figure [2] – Condition, Buildings and Trailers (by RPV)

Total RPV Assessed
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer
- Overall Asset Condition = Adequate, Substandard, Inadequate

RPV of Adequate, Substandard, Inadequate
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer
- % Adequate: Overall Asset Condition = Adequate
- % Substandard: Overall Asset Condition = Substandard
- % Inadequate: Overall Asset Condition = Inadequate

## Figure [3] – Condition, OSFs (by RPV)

Total RPV Assessed
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = OSF
- Overall Asset Condition = Adequate, Substandard, Inadequate

RPV of Adequate, Substandard, Inadequate
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = OSF
- % Adequate: Overall Asset Condition = Adequate
- % Substandard: Overall Asset Condition = Substandard
- % Inadequate: Overall Asset Condition = Inadequate

## Figure [4] – Condition, OSF System Type (by RPV)

Filter each of the below by the following OSF Property Type:
- For Electrical: Asset Type = 615 Elect Generation, Transmission, Distribution
- For Sewage: Asset Type = 640 Sewage Systems
- For Water: Asset Type = 650 Water Supply, Pumping, Treatment, Distribution
- For Paved Areas: Asset Type = 470 Roads, Walks, and Paved Areas

Total RPV Assessed
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = OSF
- Overall Asset Condition = Adequate, Substandard, Inadequate

RPV of Adequate, Substandard, Inadequate
- RPV
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = OSF
- % Adequate: Overall Asset Condition = Adequate
- % Substandard: Overall Asset Condition = Substandard
- % Inadequate: Overall Asset Condition = Inadequate

## Figure [5] – Deferred Maintenance

Total RPV Assessed
- Deferred Maintenance
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Property Type = Building, Trailer, OSF
- Status = Operating, Outgranted, Standby

## Figure [6] – Utilization by Space Type

Office Usable Sqft
- Util-Office Usable SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Office Utilized Sqft
- Util-Office Utilized SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Storage Usable Sqft
- Util-Storage Usable SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Storage Utilized Sqft
- Util-Storage Utilized SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Total Usable Sqft
- Util-Total Usable SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Total Utilized Sqft
- Util-Total Utilized SF
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)

Note: "Other" Usable & Utilized Sqft = Total minus Storage minus Office

## Figure [7] – Number of Excess and Inactive Facilities by Program

Number of Excess Assets
- Fiscal Year = 2016
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = Y
- Status does not equal: Active Land, Inactive Land
- Property Type = Building, Trailer, OSF

Number of Inactive Assets (but not excess)
- Fiscal Year = 2016
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer
- Status = In-Situ Closed
  In-Situ Closed LTM
  Shutdown
  Undergoing Stabilization/Deactivation
  Undergoing Decommissioning
  Undergoing Disposition

## Figure [8] – Number of Excess and Inactive Facilities by Fiscal Year

Number of Excess Assets
- Fiscal Year
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = Y
- Status does not equal: Active Land, Inactive Land
- Property Type = Building, Trailer, OSF

Number of Inactive Assets (but not excess)
- Fiscal Year
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer
- Status = In-Situ Closed, In-Situ Closed LTM, Shutdown, Undergoing Stabilization/Deactivation Undergoing Decommissioning Undergoing Disposition

## Figure [9] – Carrying Costs for Excess and Inactive Facilities for FY 2016

For Excess Assets
- Actual Annual Maintenance
- Op Costs-Total
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = Y
- Property Type = Building, Trailer, OSF

For Inactive Assets (but not excess)
- Ownership = DOE Owned (O)
- Program Office = EE, EM, FE, NE, NNSA, SC
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer
- Status = In-Situ Closed, In-Situ Closed LTM, Shutdown, Undergoing Stabilization/Deactivation, Undergoing Decommissioning, Undergoing Disposition

For Portsmouth & Paducah Sites:
- Actual Annual Maintenance
- Op Costs-Total
- Ownership = DOE Owned (O)
- Program Office = EM
- Excess Indicator = N, (Blank)
- Property Type = Building, Trailer, OSF
- Status = Operating, Outgranted, Standby, (Blank)
- Site Name = Paducah Gaseous
- Site Name = Portsmouth Gaseous

## Figures [10] – [13] and Table [B]

Data Source: Prior year enacted appropriates and Integrated Facilities and Infrastructure Crosscut submissions for Congressional Requests – data provided by programs.

## Table [A]

As defined in the FIMS User Dictionary