



# FY 2014 Office of Science Composite Sustainability Plan

May 2, 2014



Advanced Photon Source at ANL



Spallation Neutron Source at ORNL



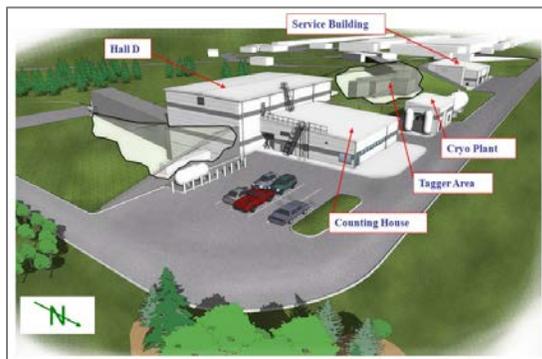
Linac Coherent Light Source (LCLS)  
Beam Transfer Hall (under construction)



National Synchrotron Light Source –  
II (NSLS-II) at BNL (rendering)



Molecular Foundry at LBNL



12 GeV Upgrade Project at TJNAF  
(rendering)

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## I. Executive Summary

### Management Vision and Strategy

The Office of Science (SC) Composite Sustainability Plan (CSP) covers the 14 SC laboratories and sites that support SC's mission activities. They are:

Ames: Ames National Laboratory, Iowa  
ANL: Argonne National Laboratory, Illinois  
BNL: Brookhaven National Laboratory, New York  
Fermi: Fermi National Accelerator Laboratory, Illinois  
LBNL: Lawrence Berkeley National Laboratory, California  
NDRL: Notre Dame Research Laboratory  
ORNL: Oak Ridge National Laboratory, Tennessee  
ORISE: Oak Ridge Institute for Science and Education, Tennessee  
ORO: Oak Ridge Office, Tennessee  
OSTI: Office of Scientific and Technical Information, Tennessee  
PNNL: Pacific Northwest National Laboratory, Washington  
PPPL: Princeton Plasma Physics Laboratory, New Jersey  
SLAC: SLAC National Accelerator Laboratory, California  
TJNAF: Thomas Jefferson National Accelerator Facility, Virginia

The laboratories and sites are referred to as the "SC complex" and the term "sites" is often used in this document to refer to all of them collectively. Together, these sites have over 1,600 buildings with over 27 million square feet of space, 270 miles of electrical distribution and a similar amount of gas/steam/water distribution utilities, over 500 miles of roads and sidewalks and 43,000 acres of land. Sites vary in size from those with only one building (OSTI and NDRL) to those with hundreds of buildings such as Fermi, SLAC, BNL and ORNL. Each site prepares a Site Sustainability Plan (SSP) describing their progress in and plans for meeting the goals in DOE's *2013 Strategic Sustainability Performance Plan (SSPP)*. Sites also prepare a Consolidated Energy Data Report (CEDR) which supports their SSPs.

The intent of this CSP is to assess SC's overall progress in and plans for meeting the DOE's sustainability goals across all of its sites together (i.e., the "portfolio" view). The CSP helps strategically guide the sustainability efforts of its portfolio of sites and optimize their collective efforts to achieve sustainability goals.

With a comprehensive approach to fulfilling the DOE sustainability goals, SC advances the DOE sustainability mission with a diverse, focused effort to integrate sustainability into facilities and activities. Scientists and facilities staff partner leverage the outcomes of their DOE-sponsored research and development programs to pursue and deploy technical innovations and maximize the efficient use of energy and natural resources. SC sites work to transform site culture about ways they can minimize environment impacts and to engage employees in supporting sustainability at work, at home, and in the community to advance regional, national, and worldwide sustainability.

Management strategies to achieve these goals include:

- Prioritizing targets of opportunity consistent with impact potential and available resources;
- Leveraging the strengths of individual sites to meet the goals across the portfolio;
- Leveraging in-house knowledge, skills, and experience across the portfolio organizations;
- Regularly sharing best practices and approaches within SC sites and across DOE; and
- Encouraging communication at all levels.

Clean energy and sustainability have long been at the core of the SC mission. While SC is striving to meet the goals established in DOE's 2013 SSPP such as reducing greenhouse gas emissions (GHG) and reducing energy and water usage, the most significant contribution of the DOE SC complex to the Nation's broader sustainability goals is likely to come from research breakthroughs aimed at dramatically reducing our overall national dependence on imported oil and fossil fuels, thereby significantly cutting emissions. The SC national laboratories and the large-scale scientific user facilities that they house and support are among the Nation's most important assets in the quest for a new, more sustainable energy economy aimed at reducing this dependence. The national laboratories and their major facilities are key national resources to achieving the scientific breakthroughs needed to revolutionize energy technologies and put energy production, transmission, and use on a more sustainable basis.

As will be demonstrated in this plan, SC is on track to meet and/or exceed most sustainability goals established in the DOE's SSPP.

## **Major Assumptions, Issues, and Funding Strategies**

### *Assumptions*

While the specific missions vary within SC portfolio of laboratories and sites, it is assumed that SC will continue to build and operate large-scale, sophisticated national scientific user facilities, referred to as High Energy Mission Specific Facilities (HEMSF). These facilities are essential to achieving the SC mission and form the foundation of the Nation's infrastructure for research in the physical sciences and basic research on energy.

HEMSFs include large particle accelerators and x-ray light sources, neutron scattering sources, supercomputers, reactors, specialized facilities for nanoscience and genomics, and other large-scale facilities used by some 29,000 researchers from universities, national laboratories, and industry across the nation each year. Examples of SC HEMSFs are listed below:

- Advanced Photon Source at ANL;
- National Synchrotron Light Source at BNL;
- Relativistic Heavy Ion Collider at BNL;
- Leadership Computing Facilities at ORNL, ANL, and LBNL;
  - National Energy Research Scientific Computing Center at LBNL
  - Computational Sciences Building at ORNL
  - Multiprogram Research Facility at ORNL

- Leadership Computing Facility at ANL
- Linac Coherent Light Source (LCLS) and Stanford Synchrotron Radiation Light Source at SLAC; and
- Continuous Electron Beam Accelerator Facility at TJNAF.

Approximately two-thirds of SC's purchased electricity is used to operate its HEMSFs and purchased electricity constitutes approximately three quarters of SC's Scope 1 and 2 GHG emissions. Electricity usage is projected to increase substantially through 2020 from the FY 2008 base as new and upgraded HEMSFs are completed and come on-line. The projected level in FY 2020 is 3,151,747 Mwh, an increase of 1,223,296 Mwh above the FY 2008 level of 1,928,451 Mwh. Applying the 28% reduction goal for GHG to the FY 2008 level, shows that SC ought to be at 1,388,484 Mwh in FY 2020. Thus there is a 1,763,263 Mwh difference between the FY 2020 goal and the projected use. The only economical way for SC to achieve the necessary Scope 1 and 2 GHG reduction goal is via the purchase of Renewable Energy Credits (RECs). SC assumes that the purchase of RECs will continue to be an acceptable approach to meeting the Scope 1 and 2 GHG reduction goal.

It is also assumed that the organizational structure within the SC's current portfolio of sites will remain the same, and that within this portfolio there is sufficient flexibility and adaptability to meet sustainability performance targets and goals. Furthermore, SC expects that new cost-effective sustainability opportunities will emerge in the near future as technologies advance and/or costs decline.

The Departmental re-organization which created the Under Secretary for Science and Energy (S4) is expected to result in teaming and cross-fertilization opportunities across S4's main programs of Science, Energy Efficiency & Renewable Energy, Fossil and Nuclear.

### *Issues*

It is likely that SC and every site will continue to be impacted by fiscal constraints for the foreseeable future and such constraints could affect goal accomplishment.

The average age of SC's buildings is 40 years and most were constructed in a time when sustainability was not a key consideration. Renovating and modernizing these buildings to meet current and projected mission requirements as well as High Performance Sustainable Building (HPSB) guidelines is a high priority. The SC Science Laboratories Infrastructure (SLI) program is constructing new buildings and renovating others to meet mission requirements as well as HPSB goals (e.g., Leadership in Energy and Environmental Design (LEED®) certification). However, budget constraints and shortfalls have significantly slowed the SLI program's progress toward helping sites achieve the 15% goal for HPSB by FY 2015.

The continued growth of SC mission activities especially of the construction and operation of new and upgraded HEMSFs will require large increases in the purchase of electricity as described earlier as well as increased water consumption for process cooling. These increases are despite efforts to develop and utilize the most energy and water efficient design and equipment. Operating costs of HEMSFs are a continuing concern to program offices as

evidenced by SC laboratory participation in the "2nd Workshop on Energy for Sustainable Science at Research Infrastructures" hosted by CERN, Geneva, Switzerland, October 23-25, 2013 and other such meetings and conferences focusing on sustainability programs, energy management/carbon reduction successes, and future plans for more sustainable research machines and laboratory infrastructure. Fortunately, Federal agencies have the option to purchase RECs to offset electricity purchases thereby reducing GHG Scope 2 emissions and allowing SC to meet the reduction goals. However, increased purchases of RECs to meet the Scope 1&2 GHG reduction goal and the renewable energy goal (20% of electrical usage by FY 2020) pose an increasing burden on site operating expenses.

Transmission and Distribution (T&D) emissions account for 32% of Scope 3 GHG emissions. As of the end of FY 2013, SC had achieved a reduction of 13.1% which exceeds the FY 2020 12% reduction goal primarily by reducing commuting via telework and carpooling and reduced business travel via video & tele-conferencing. Projected increases in electricity use for new and upgraded HEMSFs will increase T&D emissions and could jeopardize maintaining the current success without continued success in reducing commuting and business travel.

With regard to energy intensity calculations (BTU/sf), sites have the option to exclude separately-metered energy-intensive loads in buildings and other structures that are driven by mission and operational requirements. This exclusion option allows SC to work toward achieving the 30% reduction energy intensity goal by FY 2015. SC on a portfolio basis has already achieved a 32% reduction as of the end of FY 2013. However, no similar exclusion option exists for water usage in water intensive facilities. Thus, increased water use by new and updated HEMSFs will tax SC's ability to meet the 26% potable water intensity (Gal per gross square foot) reduction. SC proposes that DOE seek an exclusion option for facilities with intensive water use.

External factors—such as local climate change, variability in state and local rules and regulations, low utility costs which serve as a dis-incentive to third party funded projects, access to clean energy infrastructure, and the limitations of deploying large-scale onsite renewable technologies—also pose challenges.

### *Funding Strategies*

SC sites apply a variety of funding strategies as part of this effort. These strategies include:

- Prioritizing the use of available funds, taking into consideration high-value impact and return on investment;
- As specific goals are met or exceeded, focusing resources on areas at risk or falling behind;
- Capitalizing on maintenance and repair needs as opportunities to implement sustainability projects;
- Capitalizing on investments to advance the SC's state-of-art research facilities and to modernize its general purpose facilities and infrastructure supporting research activities.
- Demolishing inefficient buildings and associated infrastructure in conjunction with construction of new energy-efficient buildings;

- Re-investing savings from indirect funded projects into additional high payback ones.
- Pursuing performance based contracting (Energy Savings Performance Contracts (ESPCs) and Utility Energy Savings Contracts (UESCs) and other opportunities) to expedite achievement of sustainability goals while spreading out costs over time;
- Exploring potential for collaboration with Research, Development, Demonstration and Deployment programs to incorporate advanced efficiency and renewable energy demonstration projects; and,
- Leveraging available in-house expertise across sites and organizations.

## Successes and Challenges

The SC sites have had a wide range of successes across the portfolio, helping to meet and exceed DOE sustainability goals. Examples of successes for 2013, in no particular order, are as follows:

- ANL energy savings reinvestment program generates more than \$1 million in annual energy and water savings.
- ANL awarded an ESPC contract for a Combined Heat and Power (CHP) plant. The planned CHP Plant will generate savings of over \$3,113,389/year; will produce 342,454 BBTU/year in total energy savings; will generate 6.3 MW of electricity per hour; and, will reduce carbon emissions by over 33,044 tons/year.
- Many SC sites (e.g., ANL, PNNL, ORNL, Fermi, PPPL) have established sustainability awareness initiatives including symbols/logos, websites and newsletters to provide information, highlight initiatives and encourages employees to document their own sustainability success stories. An example is Fermi's new symbol shown below. It includes an image of Fermi's Wilson Hall and a Great Blue Heron (a bird commonly found at Fermi) and its reflection in a pond. The phrase "Green Today for a Better Tomorrow" summarizes Fermi's commitment to environmental sustainability. LBNL's logo also shown below.



- LBNL received a LEED – NC Platinum certification, the highest level awarded by the US Green Building Council (USGBC), for the major renovation of Building 74. For the same project, the Lab also shared a 2013 Super Heroes Award with two other UC campuses given by the Northern California Chapter of the USGBC.
- LBNL partnered with Lawrence Livermore National Lab on soliciting proposals to develop a 10-acre solar photovoltaic project at the LLNL site. Once the project is awarded, Berkeley Lab would purchase a portion of the array output through our federal utility provider on the main site.

- LBNL adopted a new policy that sets sustainability standards for new building construction. The policy is intended to drive higher performance in buildings by setting clear sustainability targets that can be easily communicated with design teams and carried through into operations.
- LBNL has established a senior position of Chief Sustainability Officer to better coordinate and promote sustainability.
- BNL received 2013 DOE Sustainability Award for hosting the largest utility-scale solar photovoltaic (PV) electricity generating plant, Long Island Solar Farm, funded through a 20-year power purchase agreement (PPA), partnering BNL with BP Solar International, LLC, and the Long Island Power Authority.
- PNNL received 2013 DOE Sustainability Award for implementing innovative methods and cross-disciplinary research to support sustainability goals attainment. PNNL leverages the annual Site Sustainability Plan, Campus Master Plan, and Global Reporting Initiative to goal planning, and monitoring of performance.
- ORNL received a 2013 Federal Energy and Water Management Award for the water resource, energy, and fleet Management Programs.
- ORNL's third Annual Sustainability Summit was held in Knoxville, Tennessee, with close to 300 in attendance. Southeast Sustainability Group (SSG), a new nonprofit sustainability organization, was introduced. SSG comprises ORNL and other research, academic, and industry partners throughout eight southeastern states.
- ORNL was awarded a 2013 GreenGov Presidential Award in the "Good Neighbor" category in November 2013.
- Sustainable Transportation: As a result of continuous promotion of participation in Smart Trips, ORNL experienced a 21% increase in registrants this year, with a total of 101 employees logging 17,655 commute alternative entries.
- ORNL received the 2013 Smart Trip Commuter Challenge Award (Winner Heavy Weight category and second place Overall Commuter Challenge).
- SLAC has expanded its zero waste program to several major office buildings and all the LCLS user areas. Approximately one-third of the staff, work in buildings where the program has been implemented. The program utilizes a model developed by the City of San Francisco for commercial office buildings that includes centralized waste, recycling, and compost collection areas, including compost collection for paper towels in the restrooms. Based on waste audit results, over 85% of a typical building's waste is diverted from the landfill after implementation.

- SLAC is launching a behavioral change campaign to encourage double-sided printing and eliminate desktop printers. Network printers default to double-sided printing. SLAC accomplished a 26% reduction in paper purchased in FY12 from the previous year.
- The Fermilab Grid Computing Center was awarded the Energy Star award for data centers in each of the last three consecutive years.
- PPPL received a Silver Award from the Federal Electronics Challenge in 2013. PPPL also earned the DOE GreenBuy Gold Award for the purchasing of products with minimum environmental products for the second-consecutive year.
- Many sites are promoting telework, better high quality conferencing and communication software to reduce travel costs for Scope 3 GHG. For example, PNNL initiated a Telework Program, with staff members logging over 20,000 days collectively. Beyond helping achieve GHG goals by eliminating commuting miles, flexible work arrangements save staff money and time, reduce stress, increase productivity, and help staff to meet a better work/life balance. In addition, 34 collaboration-ready conference rooms were established throughout PNNL and satellite locations. Nearly half of these have high-end Tandem video conferencing systems ideally suited for meetings that require a large high definition (HD) video display. Other rooms include a Polycom Roundtable, a 360 degree web cam with “smart” audio, so that participants in multiple locations have full visual and audio views of a meeting. Lync software has been upgraded and helps staff stay connected - to work, customers, and each other - via chat, audio, or video from their desktop or laptop, iPad, or cell phone device. These collaboration tools contributed to a reduction in PNNL Scope 3 GHG from employee commuting and will lead to reductions in business travel.
- ANL installed a geothermal heat pump system in the Building 224 Visitors Center in FY 2012. The smart geothermal system eliminated on-site fossil fuel combustion of approximately about 668 million Btu of natural gas per year. This is roughly equivalent to 78,100 lbs of CO<sub>2</sub> per year. TJNAF constructed ground source hybrid geothermal well field on their new SLI construction project.
- ORNL is seriously considering incorporating a 2 MW generator in the 7000 area revitalization plans. The generator would be powered by burning natural gas from their landfill.

Challenges are discussed in Section III Goal Summary Table and Section IV Goal Risk Mitigation & Multiyear Plan.

## **II. Organization and Funding**

### **Structure & Coordination**

The SC portfolio incorporates sustainability throughout its program elements and throughout multiple Departmental processes. Sustainability is integrated from the Director of the Office of

Science, through the Deputy Director for Field Operations (DDFO), out to each of the sites, and down to the staff and contractors performing the sustainability tasks. Sustainability efforts are tied to the laboratory planning process, budget process, maintenance and repair activities, and contracting and procurement efforts.

The SC organizations have formal sustainability responsibilities in accordance with DOE Order 436.1, *Departmental Sustainability*. The DDFO supports the Director of the Office of Science in achieving sustainability goals by:

- Coordinating sustainability targets and projects with Field Managers;
- Determining alternative funding strategies or requesting resources through the annual internal budget process; and
- Reporting to the Director of the Office of Science on sustainability progress and plans.

Field Managers support sustainability goals by:

- Monitoring site performance in achieving sustainability goals;
- Integrating sustainability targets into contracting documents, such as Contractor Requirements Documents and Performance Evaluation and Measurement Plans;
- Coordinating with contracting officers and contractors; and
- Reporting information on sustainability projects and targets to Program Offices and the Director of the Office of Science (e.g., via the Site Sustainability Plans and Annual Laboratory Plans).

The SC organizations also support sustainability through an informal network of sustainability groups and teams. Sustainability points of contact within the office of the Deputy Director for Field Operations, site offices and laboratories collaborate to take advantage of sustainability best practices across the complex and support each other in other sustainability efforts. Sites have a variety of groups and teams that reach out to the community and collaborate with local organizations supporting sustainability activities. SC's Hqs sustainability staff maintains a SC file transfer protocol site with relevant information and is establishing a Powerpedia web site to further aid communication and information exchange.

SC sites rely on the Office of Sustainability Support (HS-21) for technical assistance. They also capitalize on DOE and interagency working groups as opportunities to integrate sustainability strategies between the SC organizations and other DOE elements. Examples are: the Interagency Sustainability Working Group, the Sustainability Performance Office (SPO) Climate Change Adaptation Working Group, SPO Peer-to-Peer Network, SPO/CIO Information Technology Sustainability Working Group, HS-21 Sustainability Assistance Network, HS-21 Sustainable Acquisition Working Group, HS-21 Fugitive Emissions Working Group, Energy Facilities Contractors Group's Sustainability and Infrastructure Working Group as well as the Facilities and Infrastructure Working Group of SC laboratories' Operations Improvement Council. SC recommends that the DOE Sustainability Working Group established in DOE Order 436.1, *Departmental Sustainability*, be re-established to improve intra-departmental communication, sharing and planning.

It is also expected in the next year that the Departmental re-organization which created the Under Secretary for Science and Energy (S4) will result in significant teaming and cross-fertilization opportunities across the S4's main programs – Science, Energy Efficiency & Renewable Energy, Fossil and Nuclear.

Additional working groups will be formed as needed to focus on specific areas of need and opportunity.

### Funding & Planning

Funding related to sustainability efforts SC contractor operated sites comes from indirect funding (i.e., overhead), third-party ESPC/UESC funding and as secondary/ancillary benefits of existing SC program funding such as SLI program construction projects. For SC government operated sites (OSTI and ORO) funding comes from program direction funds and the SLI program. Sites develop, prioritize, implement and manage their projects. Projects funded via ESPC/UESC contracts are managed by the ESPC/UESC contractor.

Sustainability funds are often tied to facility management and operations budgets. Whenever possible, the SC sites leverage maintenance and repair needs as opportunities to implement sustainability projects. Budget uncertainty and Continuing Resolutions hinder the SC organizations' ability to develop realistic budget scenarios. Severe fiscal constraints are likely to continue for the foreseeable future, which will mean that linking sustainability efforts to maintenance and repair efforts and carefully prioritizing the use of available funds will continue to be the most effective strategies in implementing sustainability projects. Sites have developed a path forward in an attempt to meet the DOE sustainability goals by emphasizing low to no cost behavioral changes.

Several sites have implemented energy savings reinvestment program wherein savings from energy and water projects are re-invested in additional projects. ANL's program has generated over \$1 million for re-investment. SC encourages its sites to follow their lead.

SC is committed to expanding the use of performance based contracts (ESPCs, UESCs, PPAs) to increase the efficiency of its facilities and reduce operating costs. Details of SC's efforts in 2013 and 2014 are described in a later section. Another alternative funding strategy is exploring potential collaborations with DOE research programs to incorporate advanced efficiency and renewable energy demonstration projects.

### III. Goal Summary Table

SSPP Goal #	DOE Goal	FY 2013 Status (relative to baseline, if applicable)	Risk of Goal Non-attainment
<b>GOAL</b>	<b>1: Greenhouse Gas Reduction</b>		
1.1	28% Scope 1 & 2 GHG reduction by FY 2020 from a FY 2008 baseline (2013 target: -17%)	-32.8%	Low

SSPP Goal #	DOE Goal	FY 2013 Status (relative to baseline, if applicable)	Risk of Goal Non-attainment
1.2	13% Scope 3 GHG reduction by FY 2020 from a FY 2008 baseline (2013 target: -4%)	-13.1%	Low
<b>GOAL</b>	<b>2: Buildings &amp; Alternative Financed Projects</b>		
2.1	30% energy intensity (Btu per gross square foot) reduction by FY 2015 from a FY 2003 baseline (2013 target: -24%)	-32.5%	Low
2.2	Energy Independence and Security Act (EISA), Section 432 energy and water evaluations	In compliance	Low
2.3	Individual buildings metering for 90% of electricity (by October 1, 2012); for 90% of steam, natural gas, and chilled water (by October 1, 2015) <sup>1</sup> (2013 target: 90% and 50%, respectively)	Electricity: 95.5%; Steam: 98.8%; Natural Gas: 96.3%; Chilled Water: 100.0%;	Low
2.4	Cool roofs, unless uneconomical, for roof replacements unless project already has CD-2 approval. New roofs must have thermal resistance of at least R-30. <sup>2</sup>	In compliance 3,484,436 sq. ft. of cool roofs	Low
2.5	15% of existing buildings greater than 5,000 gross square feet (GSF) are compliant with the Guiding Principles (GPs) of HPSB by FY 2015 (2013 target:11%)	9.3%	High
2.6	All new construction, major renovations, and alterations of buildings greater than 5,000 GSF must comply with the GPs <sup>3</sup>	In compliance	Low
2.7	Implement alternatively financed projects to support the President's Performance Contracting Challenge	BNL UESC - \$14.9M	Low
<b>GOAL</b>	<b>3: Fleet Management</b>		
3.1	10% annual increase in fleet alternative fuel consumption by FY 2015 relative to a FY 2005 baseline (2013 target:114% cumulative since 2005; 159% by FY 2015)	97.6%	High
3.2	2% annual reduction in fleet petroleum consumption by FY 2020 relative to a FY 2005 baseline (FY 2013 target: -16% cumulative since 2005; -30% by FY 2020)	-36.0%	Low
3.3	100% of light duty vehicle purchases must consist of alternative fuel vehicles (AFV) by FY 2015 and thereafter (75% FY 2000 – 2015) <sup>4</sup>	178.7% (exceeding goal)	Low
<b>GOAL</b>	<b>4: Water Use Efficiency and Management</b>		
4.1	26% potable water intensity (Gal per gross square foot) reduction by FY 2020 from a FY 2007 baseline (2013 target: -12%)	-20.5%	Low

<sup>1</sup> Per NECPA (42 U.S.C Section 8253) the term "buildings" includes industrial, process, or laboratory facilities

<sup>2</sup> Secretary of Energy Chu, Installation of Cool Roofs on Department of Energy Buildings, Memorandum for Heads of Departmental Elements, June 1, 2010.

<sup>3</sup> DOE considers buildings meeting the following criteria as complying with GPs: Any building that achieves LEED-EB Silver or higher or LEED-NC Gold or higher; Any building that achieves a Green Globes-NC rating of four or a Green Globes CIEB rating of three; Any building that has been occupied for more than one year that achieves Living Status designation by the Living Building Challenge (although included as policy in the 2012 SSPP, these equivalencies are contingent upon OMB and CEQ approval).

<sup>4</sup> EPA Act 1992 goal updated per Presidential Memorandum on Federal Fleet Performance on May 24, 2011.  
<http://www.whitehouse.gov/the-press-office/2011/05/24/presidential-memorandum-federal-fleet-performance>

SSPP Goal #	DOE Goal	FY 2013 Status (relative to baseline, if applicable)	Risk of Goal Non-attainment
4.2	20% water consumption (Gal) reduction of industrial, landscaping, and agricultural (ILA) water by FY 2020 from a FY 2010 baseline (2013 target: -6%)	-2.8%	High
<b>GOAL</b>	<b>5: Pollution Prevention and Waste Reduction</b>		
5.1	Divert at least 50% of non-hazardous solid waste, excluding construction and demolition debris, by FY 2015	55%	Low
5.2	Divert at least 50% of construction and demolition materials and debris by FY 2015	95.7%	Low
<b>GOAL</b>	<b>6: Sustainable Acquisition</b>		
6.1	Procurements meet requirements by including necessary provisions and clauses (Sustainable Procurements / Biobased Procurements)	98.2%	Low
6.2	Ensure new contract actions contain bio-based clauses, as applicable, striving towards 95% compliance	In compliance	Low
<b>GOAL</b>	<b>7: Electronic Stewardship and Data Centers</b>		
7.1	All data centers are metered to measure a monthly Power Utilization Effectiveness (PUE) of 100% by FY 2015 (2013 target: 80%)	~40%	Medium
7.2	Maximum annual weighted average PUE of 1.4 by FY 2015 (2013 target: 1.60)	1.40	Low
7.3	Electronic Stewardship - 100% of eligible PCs, laptops, and monitors with power management actively implemented and in use by FY 2012	83.7%	Medium
7.4	Ensure applicable IT contracts include clauses for EPEAT, ENERGY STAR, or FEMP-designated products	In compliance	Low
<b>GOAL</b>	<b>8: Renewable Energy</b>		
8.1	20% of annual electricity consumption from renewable sources by FY 2020 (2013 target: 7.5%)	14.4%	Low
<b>GOAL</b>	<b>9: Climate Change Adaptation</b>		
9.1	Identify one priority facility, location, or region that would most benefit from a detailed climate vulnerability assessment pilot	Yes, sites identified	Low

Note: The risk of goal non-attainment for the portfolio is based upon the aggregation of individual SSPs; please see the SSPs for individual site performance details.

#### IV. Goal Risk Mitigation and Multi-Year Plan

##### Goal Risks

Goals that SC has a medium/high risk of non-attainment are discussed below.

***Goal 2.5 High Performance Sustainable Buildings – 15% of existing buildings greater than 5,000 gross square feet (GSF) are compliant with the Guiding Principles (GPs) of HPSB by FY 2015 (2013 target:11%)***

SC is not meeting either the interim target nor does it expect to meet the FY 2015 goal. See detailed discussion in separate HPSB section below.

***Goal 3.1 Alternative Fuel (AF) Use – 10% annual increase in fleet alternative fuel consumption by FY 2015 relative to a FY 2005 baseline (2013 target:114% cumulative since 2005; 159% by FY 2015)***

As of the end of FY 2013, SC had increased AF use 97% from the FY 2005 baseline. However, the interim target is 113% so SC is not meeting the interim target. And, SC will most likely not meet the 159% increase for FY 2015. The primary reasons are: sites were already using significant amounts of alternative fuels in the baseline year; fleet sizes were reduced with the 35% non-mission essential fleet reduction; budget constraints have reduced travel; more fuel efficient vehicles are in the fleet; increased reliance on “neighborhood” (or “low-speed”) AFV powered by biodiesel or are all-electric which do not count as “vehicles” for FAST reporting; and, budget constraints have also reduced the purchase/lease of additional AF vehicles. Given these reasons, SC does not expect to reach the AF reduction goal in the outyears either. SC proposes that the annual percentage increase be significantly reduced from the current 10% or, that this Goal be dropped altogether and focus be placed on Goal 3.2 Reduction in Petroleum Use. SC is easily reaching the goal for petroleum reduction.

***Goal 4.2 Industrial, Landscaping, and Agricultural (ILA) Water Use – 20% water consumption (Gal) reduction of industrial, landscaping, and agricultural (ILA) water by FY 2020 from a FY 2010 baseline (2013 target: 6%)***

SC did not meet the interim target of 6% reduction by FY 2013 even on a portfolio basis. Four SC sites report ILA water use. Three had reduction of 6% or greater reduction but PNNL had an increase. The increase is due to a major campus expansion (i.e., Capabilities Replacement Project) completed after the FY 2010 base year. Landscaping at PNNL is necessary for fire offsets, dust control, and heat island reduction. PNNL corrective actions include: re-location of sprinklers to avoid wasteful runoff and, installation of irrigation meters to monitor, analyze, and control ILA water usage. In addition, new buildings will be HPSB and will have aggressive water saving/no water attributes incorporated as part of the engineering standards. However, even these changes will likely not result in PNNL achieving the FY 2020 goal given the mission expansion since the baseline was established and planned future expansions. SC proposes a re-baselining for PNNL reflecting its mission growth and proposes that DOE develop a re-baselining process for significant mission changes.

***Goal 7.1 All data centers are metered to measure a monthly Power Utilization Effectiveness (PUE) of 100% by FY 2015 (2013 target: 80%)***

Of the 29 SC data centers, 40% of them meet both the interim and FY 2015 goals for metering data center and IT power usage. The remaining ones are working toward these goals. Key issues are: uncertainty of plans for consolidation of data centers; difficulty of measuring data center power use when the center is embedded in a building; and, issues with installation, calibration and use of advanced meters. SC will establish a support group to share information on barriers and possible actions to address them. The Office of Sustainability Support (HS-21)

has agreed to provide technical assistance. SC will also engage SC's IT staff and the DOE Information Technology Sustainability Working Group.

***Goal 7.3 Electronic Stewardship - 100% of eligible PCs, laptops, and monitors with power management actively implemented and in use by FY 2012***

Six of SC's sites have not yet achieved the FY 2012 goal of 100% power management for computers (desktop and laptop) and monitors (CRT and computer). The primary issue is power management of desktop computers. SC will establish a support group to share information on barriers and possible actions to address them. The Office of Sustainability Support (HS-21) has agreed to provide technical assistance. SC will also engage SC's IT staff and the DOE Information Technology Sustainability Working Group.

***General Challenges***

General challenges include: continued mission expansion, aging stock of existing buildings and favorable power and energy rates. Each is discussed below.

Mission expansion via construction of new facilities and capability additions will make goal attainment more challenging in the outyears due to increased electrical energy and water consumption. Electrical energy can be offset with REC purchases. Water use, however, has no available offsets at this time. As mentioned earlier, SC proposes that DOE seek an exclusion option for water intensive facilities similar to the current one for energy intensive buildings.

SC's aging stock of existing buildings (average age is 40 years) present a continuing challenge in meeting the GPs for HPSB as significant operating and capital investments are required to upgrade, control and commission systems, especially heating, ventilation and air conditioning (HVAC) systems.

The rapidly evolving nature of data center management (e.g., consolidation efforts), computing technology and computer management (e.g., cloud computing, virtualization, thin clients, water cooled servers, etc.) as well as their 24-7 operation continues to complicate and slow efforts to implement metering improvements to reduce the PUE. These also affect efforts to manage power desktop/laptop computers and monitors.

Many possible improvements have not been life-cycle cost effective from a strictly financial perspective because many sites have favorable power and energy rate structure (i.e., low cost per kWh). These low rates make typical energy projects based on economic life cycle basis more difficult to justify on a payback basis and discourage the use of performance based contracts such as ESPCs.

**Multi-Year Plan**

SC will continue to strive to meet DOE's sustainability goals, leveraging knowledge and resources across its sites to achieve high-value impacts and the best return on investment. SC will use a combination of strategies to achieve the sustainability goals including:

- Integrating sustainability goals into management decisions and departmental processes, including contracting requirements;
- Integrating long-term sustainability goals into the budget process;
- Increasing funding for the SLI program for replacing and modernizing SC laboratory and office buildings;
- Pursuing alternative financing (e.g., UESC/ESPC) to implement sustainability projects;
- Promoting energy savings reinvestment efforts;
- Prioritizing high-impact, high return on investment projects;
- Integrating sustainability into all operational activities including construction, maintenance, fleet management, data centers, waste management and procurement;
- Continuing implementation of metering and associated tracking and control systems for monitoring and managing energy and water use;
- Continuing educational and behavior modification efforts to promote a sustainability culture;
- Leveraging the strengths of each individual site to achieve the goals across the portfolio;
- Promoting existing and new processes and mechanisms to share information, lessons learned and best practices; and
- Tracking progress via Site Sustainability Plans, Annual Laboratory Plans and the SC's Laboratory Performance Appraisal Process.

Specific plans for addressing goals at medium and high risk of non-attainment are discussed by goal in the previous sections except for HPSB which is discussed below.

### **High Performance Sustainable Buildings Plan**

SC is committed to pursuing HPSB ratings following the Five Guiding Principles for Federal Leadership in HPSB. This includes seeking compliance for appropriate existing buildings and implementing HPSB practices and design specifications in new building design and construction. Wherever possible, third party accreditation through the United States Green Building Council or other entities is sought during design and construction. In addition, SC programs and sites have incorporated the HPSB concepts into company policies, plans, and execution strategies.

This goal requires that 15% of existing buildings greater than 5,000 GSF be compliant with Guiding Principles (GP) for High Performance Sustainable Buildings by FY 2015. Of SC's 1,600 buildings, 666 are 5,000 sf or more. To achieve the FY 2015 goal, SC needs 100 buildings to meet the GPs. At the end of FY 2013, SC had 62 buildings (or 9.3%) that meet the GPs. It is expected an additional 34 will achieve the GPs in FY 2014 and FY 2015 as shown below. Thus, by the end of FY 2015, SC should have 96 buildings (14.4%) meeting the GPs. It is expected that SC will reach the goal by the end of FY 2016.

Site Name	Property ID	Property Name	Real Property Unique ID	Compliance Approach	Planned Compliance Year	Usage Code Desc
Ames	10	Mech Maintenance Bldg	123743	EB	2014	601 Maintenance Shops, General
ANL	213	Cafeteria	123602	EB	2015	291 Cafeteria
ANL	241	Energy Sciences Building	TBD	NB	2014	241 Multifunction Research/Lab Building
ANL	437	APS LAB/OFFICE MODULE	205543	EB	2014	401 Programmatic General Storage
ANL	448	Adv Protein Crystallization Facility	TBD	NB	2015	248 Multifunction Research/Lab Building
BNL	98	Receiving/Shipping	205856	EB	2015	591 Materials Handling
BNL	0438	Science Education Center	124231	EB	2015	234 Other School Buildings
BNL	0485	Scrap Metals Building	204594	EB	2015	400 General Storage
BNL	0515	Information Technology Division	124294	EB	2015	297 Data Center
BNL	0599	Fire House	124423	EB	2015	693 Fire Station
BNL	0817	Nuclear Science & Technology Dept	125723	EB	2015	101 Office
BNL	0860	WMF-Operations	134498	EB	2015	101 Office
BNL	0935	Science Museum	124478	EB	2015	293 Museums/Shrines/Natl Landmarks/Historic Build
Fermi	328	IARC-OPE Bldg.	TBD	LEED	2014	101 Office
Fermi	628	Data Center	123925	EB	2014	297 Data Center
Fermi	921	Site 37	123855	EB	2015	621 Vehicle Repair Shops
ORNL	1005	Ultra-Trace Forensic Science Center	143038	EB	2015	791 Laboratories, General (Non-Nuclear)
ORNL	3137	Surface Science Lab	97244	EB	2015	751 Materials Laboratory
ORNL	6011	C&TD Office Building	97325	EB	2014	101 Office
ORNL	7018	Bulk Receiving and Stores	97348	EB	2015	400 General Storage
ORNL	7601	Energy Systems Office Building	97460	EB	2015	101 Office
ORO	0101-2714 Complex	2714 Complex	97071	EB	2015	101 Office
ORISE	SC-100	SC-100	141729	EB	2015	101 Office
PNNL	318	Radiological Calibrations Lab	117346	EB	2014	704 - Calibration Lab
PNNL	LSB	Laboratory Support Building	143718	EB	2014	101 - Office
PNNL	ISB1	Information Sciences Building - 1	139810	EB	2015	101 - Office
PNNL	GPCL	General Purpose Chemistry Lab	TBD	NC	2016	Not yet assigned
PNNL	SEL	Systems Engineering Laboratory	TBD	NC	2016	Not yet assigned
SLAC	041	Admin & Engineering Bldg	90116	EB	2015	101 Office
SLAC	53	Science and User Support Bldg	AAIM # 74	NB	2015	101 Office
TJNAF	28	Support Service Center (SSC)	129969	EB	2015	101 Office
TJNAF	58	Test Lab	130263	NC	2014	793 Multifunction Research/Lab Building
TJNAF	87	Accel Maintenance Support (AMSB)	130254	EB	2015	101 Office
TJNAF	89	Accel Technical Support (ATSB)	130255	EB	2015	101 Office

The principal barrier to meeting the targets and goal has been and continues to be budget related - funding constraints, sequestrations, continuing resolutions and general budget uncertainty. However, funding may be improving. First, there are two new SLI project starts in FY 2014 budget and the proposed FY 2015 SLI budget has three new building projects: *Materials Design Laboratory (ANL)*; *Photon Science Laboratory Building (SLAC)*; and, *Integrative Genomics Building (LBNL)*; and, one general infrastructure project: *Infrastructure and Operational Improvements (PPPL)*. These projects will help sites achieve a greater number of buildings meeting the GPs but results will not be realized until FY 2016 and beyond. Second, SC sites are also utilizing performance based contracts such as UESC/ESPCs that will help contribute to buildings meeting the GP. See discussion of performance contracts below. Third, if the overall SC budget levels increase as seen in the FY 2014 appropriation and as proposed in the FY 2015 SC budget request, more overhead funds will be available to support sustainability improvement efforts.

Another barrier is the need for better information exchange regarding issues, successes, lessons learned and innovative approaches across the sites. To address this, SC has initiated an effort to identify areas of the GPs that sites are having difficulty achieving for existing buildings and to develop plans to address them. This effort will be coordinated by one of SC's sites.

SC also recommends that the SPO and the Office of Acquisition and Project Management organize an annual DOE workshop specifically on meeting the GPs sharing SC successes and

lessons learned at ORNL and PNNL (see items in section V. Highlights and Accomplishments) as well as successes and lessons learned at other DOE sites. In addition, SC recommends the formation of DOE assist teams from sites with successes that would systematically visit sites that are struggling on this goal to identify barriers and possible corporate approaches for addressing crosscutting issues.

### **EISA Section 432 Plan**

All SC sites are meeting or exceeding the EISA requirement to evaluate facilities once every four years and will continue to do so. Some sites have successfully incorporated these assessments into facility condition assessments required by DOE Order 430.1 Real Property Asset Management. SC's sites offices and Hqs sustainability staff monitors SSP/CEDR submissions and Annual Laboratory Plans to ensure SC sites will continue to meet the requirement.

### **Climate Change Adaptation**

SC sites are actively taking steps to mitigate greenhouse gas emissions from their sites, vehicles, services, supplies, procurement activities, and overall operations in order to limit the SC's contribution to climate change and mitigate the fiscal risks it poses.

Regarding climate adaptation, SC sites are identifying possible climate change vulnerabilities that can disrupt mission execution and, steps necessary to increase the resilience of SC's facilities in the face of those vulnerabilities. Events would include: rain, snow and wind events including hurricanes, floods and tornados; temperature extremes; health impacts; and, wildlife impacts. Such events even if not in the local area could disrupt energy sources (electricity, coal, natural gas, biomass, etc.) and water which would also disrupt operations.

SC sites base their approach to climate change adaptation planning on:

- the framework established by the White House Council on Environmental Quality's Interagency Climate Change Adaptation Task Force, adopted by Secretary Chu in his Climate Adaptation Policy Statement of June 2, 2011;
- the DOE Climate Change Adaptation Plan from the 2012 SSPP;
- the Executive Order 13653 – Preparing the United States for the Impacts of Climate Change issued November 1, 2013,

SC sites are working with other Federal agencies and local jurisdictions (as appropriate) to develop regional partnerships for climate change information sharing and collaboration (e.g., weather patterns), climate change vulnerabilities and risks.

Sites already conduct “all-hazard” risk assessments as required by DOE Order 150.1A Continuity Programs and DOE O 151.1C Comprehensive Emergency Management System. DOE also has a Standard 1020 - Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities. These will need to be informed by climate change vulnerabilities.

A common issue across the sites is DOE guidance on how to conduct a vulnerability assessment. To assist in development of DOE guidance, the SPO has funded a pilot assessment at TJNAF. Results from this effort are expected in late 2014.

To further aid SC sites (and other DOE sites as well), SC is working with other DOE programs to establish a support group devoted to this area. The approach would be similar to that employed by the Fugitive Emissions Working Group which has won the Secretary's Achievement Award in 2011.

Once site vulnerability assessments are completed, the information provided in them will form the basis of updates to site-wide policies, plans, guidelines, engineering standards, etc. Sites already design new buildings and renovations based on building codes for their area. These codes incorporate standards developed from past experience for their area (e.g., 100 year flood, wind and temperature extremes, etc). These codes will need to be adjusted as necessary to reflect changes. Identifying vulnerabilities of existing building, their risks and costs to correct will be a major task in the outyears.

SC recommends that the next pilot assessment effort be conducted at Oak Ridge, Tennessee and cover all the DOE sites in the area. These sites are: SC sites ORNL, ORISE, OSTI and ORO; NNSA site Y-12 and, EM site ETTP. An integrated assessment could achieve better results at a reduced cost and faster schedule. It would serve as a model for other DOE reservations with multiple sites operated by different programs.

A second recommendation is for a pilot assessment at ANL. Argonne is rewriting its Land Use and Natural Resource Management Plan, and is expending cross-discipline staff effort to identify and plan for climate change adaptation strategies. Argonne staff collaborate with regional agencies including Chicago Wilderness, the DuPage County Forest Preserve District, the Chicago Metropolitan Agency for Planning, and others, to address Midwest U.S. climate change adaptation issues. Significant research is conducted onsite related to climate change adaptation including a select number of projects utilizing Argonne property; and, the effort could benefit Fermi which is only 25 miles away.

A third recommendation for a pilot assessment is BNL. BNL is DOE's only northeast laboratory and has exposure to coastal storms (hurricanes, Nor'easters and blizzards). Extreme events are thought to be more likely to occur with an increase in ocean temperature. There may also be more subtle changes, such as changes in insect and tick population, etc.

### **President's Performance Contracting Challenge**

In January 2014, DOE renewed its commitment to the President's Performance Contracting Challenge, for a total investment of \$275 million by December 31, 2016. SC is committed to continuing its use of performance based contracts (ESPCs, UESCs, PPAs) to increase the efficiency of its facilities and reduce operating costs. Five sites (ANL, BNL, Fermi, TJNAF and ORO) have undertaken or, are evaluating performance based contracts. BNL awarded a \$12.2M UESC in late 2013 and ANL awarded a \$22M ESPC in early 2014. An additional ANL contract and ones at Fermi and ORO are expected to be completed in 2014. SC-3 has established a

Center of Excellence at the Integrated Support Center in Chicago to support site ESPC/UESC contracting efforts. SC encourages the use of performance contracts and expects continued efforts at its sites to use them to the extent that they are cost effective and present a good business case. More information on the BNL UESC contract is provided in the next section and more information on the recent ANL ESPC is provided in the “Successes” portion of the Executive Summary section.

## **V. Highlights and Accomplishments**

A number of successes and highlights are mentioned in the Executive Summary and many more are identified in the SSPs. These demonstrate SC’s commitment to meeting the DOE’s sustainability goals. Some additional key accomplishments are detailed below related to HPSBs and DOE’s first UESC under the new contracting guidelines.

### ORNL – Systematic Approach to HPSBs Yields Results

ORNL’s systematic approach to identifying HPSB candidates and applying the GPs has proven successful in achieving the DOE goal. In FY 2013, ORNL brought its HPSB tally to 23 buildings and plans 5 more in FY 2014 and FY 2015.

ORNL’s approach begins with identifying HPSB candidates based on energy use intensity (EUI), building type, existing utility meter infrastructure, and an initial evaluation of energy conservation potential. Opportunities to leverage previous sustainability focused efforts, historical energy performance improvement, existing policy and lab standards are pursued to streamline the HPSB process. Action plans for achieving building specific GPs are developed and executed while existing laboratory-wide standards are identified to fulfill HPSB policies and procedures.

The engagement of facility managers, facility engineers, and other technical facility personnel has proven crucial in acquiring quality benchmarking data, performing commissioning activities, and implementing energy conservation measures. ORNL began its HPSB efforts with focus on low complexity, low mission-specific energy use, office buildings. As experience and comfort with the GPs increased, the focus began to shift to mixed use buildings and laboratories. In these buildings, attention was primarily given to evaluating the operation of existing systems and their suitability to the facilities’ current use. Temperature and airflow set points and equipment operating sequences were examined with the intent to achieve maximum efficiency potential from existing systems. Occupant comfort and known conditions were also taken into consideration for a holistic evaluation of building performance.

ORNL pursued opportunities to ensure that HPSB related measures were included in building modernization projects but typically, large renovations were not required to achieve GPs. In most cases, building modifications included occupancy-based lighting control, plumbing fixture upgrades and some HVAC improvements. Cost was managed by replacing or adding equipment, only as necessary and placing effort on maximizing the potential of existing systems and equipment. This was often approached with an existing building commissioning process.

While all of the GPs contribute to the betterment of buildings, the retro-commissioning process has proven most beneficial in identifying opportunities to optimize existing equipment and systems to better align with current building utilization. With the evolution of research programs and projects, buildings are often used in a manner that is different from their original designs. To address this, a process of identifying, evaluating, and adjusting HVAC airflow volumes, set points, and control sequences has proven to provide the best return on investment.

ORNL plans to continue improving this system for ongoing HPSB success with recognition that achieving HPSB status is not the end but rather just the beginning of an ongoing plan-do-check-act cycle. Enduring efforts will be made to ensure that savings persist, and potentially even increase, over time. Focus will be given to expanding the existing HPSB inventory at a pace that does not compromise the ability to effectively manage the buildings in the current inventory.

#### PNNL – Radiochemical Processing Laboratory (RPL) achieves HPSB status

Constructed in 1953, the RPL is a 145,000 square foot Category II Nuclear Facility dedicated to research related to national missions in nuclear energy, nuclear non-proliferation, environmental management, homeland security, and fundamental science. In FY13, RPL became the first SC nuclear research laboratory to achieve HPSB status using the GPs for existing buildings. To meet one of the most challenging HPSB requirements (i.e., 20% reduction in energy use compared to the 2003 baseline year), significant building improvements were implemented over several years as part of planned capital improvements. These included revamping the heat recovery system, installing high efficiency chillers, adding cooling coils dedicated to the chilled water system, installing LED outside lighting), occupancy-based lighting controls, and high-efficiency plumbing fixtures. Together, these improvements reduced the energy consumption in the RPL by an impressive 25% compared to the baseline year.

To maintain this energy performance, PNNL's Building Operations Control Center continues to analyze data from RPL's advanced meters and building management system to continually monitor and improve building operations.

#### BNL UESC Contract – A First Under the New Contracting Requirements

BNL awarded the first DOE UESC contract under the new contracting requirements. Under the UESC, National Grid will facilitate third-party financing for DOE in the amount of \$12.2 million to implement lighting and other energy efficiency upgrades at the Laboratory. The loan will be repaid using the savings generated by the upgrades, which are expected to total more than \$1.3 million each year.

Because it was a first time effort, it required extensive teamwork, creativity and cooperation. The approach taken by BNL provides valuable lessons learned for other SC and DOE sites planning UESC projects.

## Appendix - Abbreviations

24-7: 24 hours a day, 7 days a week  
AF: Alternative Fuel  
AFV: Alternative Fuel Vehicle  
BTU: British Thermal Unit  
CEDR: Consolidated Energy Data Report  
CEQ: Council of Environmental Quality  
CHP: Combined Heat and Power  
DDFO: Deputy Director for Field Operations (DDFO) (SC-3)  
DOE: U.S. Department of Energy  
EISA: Energy Independence and Security Act of 2007  
EPAct: Energy Policy Act (1997 & 2005)  
EPEAT®: Electronic Product Environmental Assessment Tool  
ESPC: Energy Savings Performance Contract  
FAST: Federal Automotive Statistical Tool (GSA-owned fleet monitoring database)  
FEMP: Federal Energy Management Program  
FY: fiscal year  
GHG: greenhouse gas  
GP: Guiding Principles (for High Performance Sustainable Buildings)  
GSF: gross square feet  
HEMSF: high-energy mission specific facility  
HPSB: High Performance Sustainable Building  
HVAC: heating, ventilation, and air conditioning  
HS: Office of Health, Safety and Security, U.S. Department of Energy  
HS-21: Office of Sustainability Support  
ILA: industrial, landscaping, and agricultural water  
Kwh: kilowatt hour – measure of electrical power usage  
LEED®: Leadership in Energy and Environmental Design  
mtCO<sub>2</sub>e: metric ton CO<sub>2</sub> equivalent  
Mwh: megawatt hours  
OMB: Office of Management and Budget  
OAPM: Office of Acquisition and Project Management  
PPA: Power Purchase Agreement  
RPL: Radiochemical Processing Laboratory  
PUE: Power utilization Effectiveness  
REC: Renewable Energy Certificate  
S4: Under Secretary for Science and Energy  
SC: Office of Science, U.S. Department of Energy  
SC Complex: the 14 sites that SC manages in support of its mission activities  
SF: square feet  
SLI: SC's Science Laboratories Infrastructure program  
SPO: Sustainability Performance Office, U.S. Department of Energy  
SSP: Site Sustainability Plan  
SSPP: Strategic Sustainability Performance Plan  
T&D: transmission and distribution  
UESC: Utility Energy Services Contract