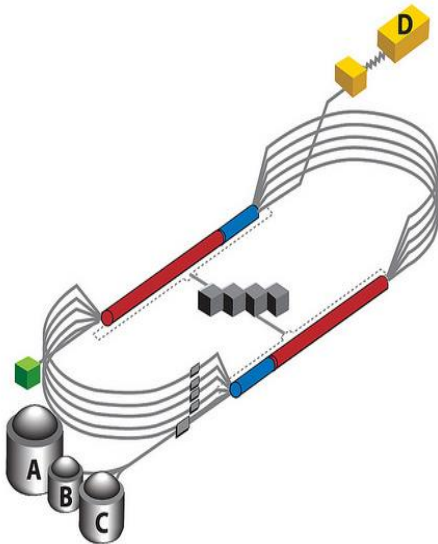
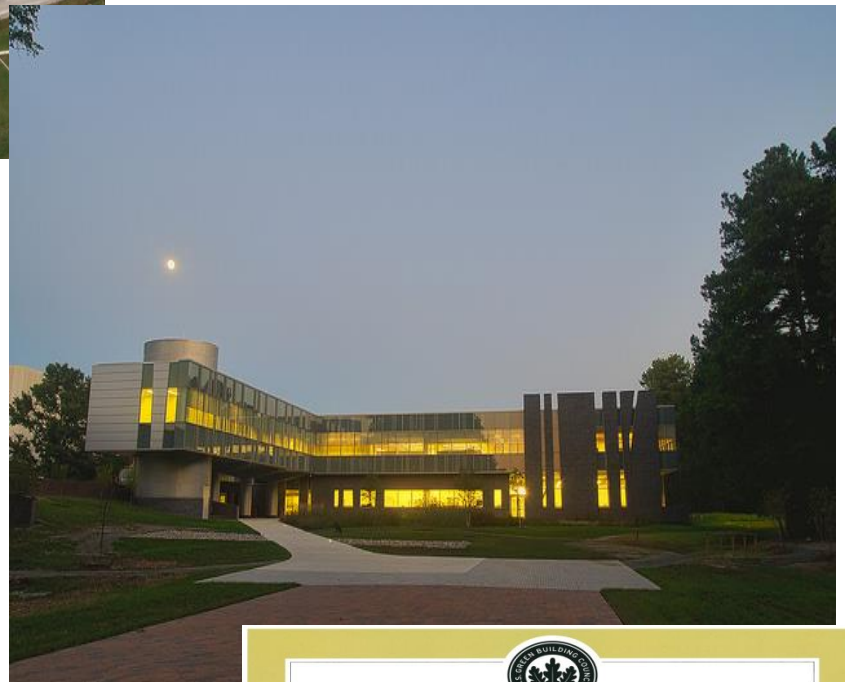
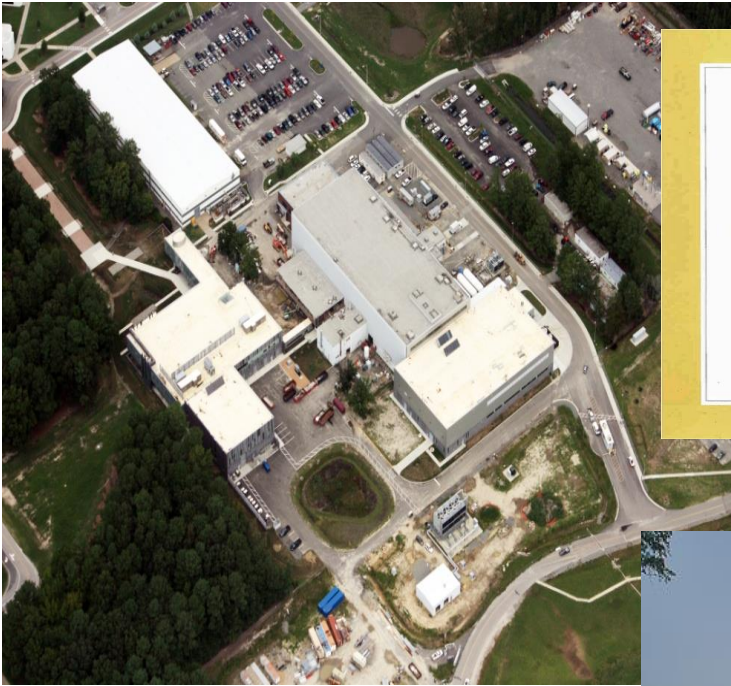


# Jefferson Lab 2015 Site Sustainability Plan



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## **List of Acronyms**

AFV – Alternative Fuel Vehicle

BTUs/GSF – British Thermal Units per Gross Square Foot

CEDR – Consolidated Energy Data Report

ECM – Energy Conservation Measure

eGRID – “Emissions & Generation Resources Integrated Database” (EPA, EIA, FERC data)

EUI – Energy Utilization Intensity

EMS – Environmental Management System

FAR – Federal Acquisition Regulation

FIMS –Facilities Information Management Systems

GeV – Billion Electron Volts

GHG – Greenhouse Gas

HEMSF – High Energy Mission Specific Facility (*critical laboratory mission operation facility*)

HPSB – High Performance Sustainable Buildings

HVAC – Heating, Ventilation and Air Conditioning

Kwh – Kilo Watt Hour

LEED – Leadership in Energy and Environmental Design

MGal – Million Gallons

MTCO<sub>2</sub>e – Metric Ton CO<sub>2</sub> equivalent

Mwh – Megawatt hour

PPA – Power Purchase Agreement

RPS – Renewable Portfolio Standard

SF<sub>6</sub> – Sulfur Hexafluoride

TEDF – Technology and Engineering Development Facility

T&D - Transmission and Distribution

# Site Sustainability Plan

## I Executive Summary

The Thomas Jefferson National Accelerator Facility (Jefferson Lab), a nuclear physics user facility, provides unique capabilities for the study of nuclear physics. Jefferson Lab maintains core capabilities in Nuclear Physics, Accelerator Science, Applied Nuclear Science and Technology, and Large Scale User Facilities/Advanced Instrumentation to support not only its own research program, but broader missions as part of the Department of Energy (DOE) laboratory system, applying these technologies in the national interest.

Jefferson Lab has achieved significant progress and remains on target to meet or exceed the set of diverse sustainability goals for Energy Utilization Intensity reduction, Renewable Energy, Scope 1 Greenhouse Gas (GHG) emissions (Fugitive and Fleet Petroleum management), Pollution Prevention and Waste Reduction, and High Performance Sustainable Building (HPSB) Guiding Principle compliance for existing facilities. Strategies have been identified and are under development to achieve other significant sustainability goals, including Water Intensity and Scope 2 and 3 GHG reduction, and the Data Center Power Utilization Effectiveness (PUE) target as defined in the DOE Strategic Sustainability Performance Plan (SSPP). The Jefferson Lab sustainability goals are integrated into the Environmental Management System (EMS) in accordance with DOE O 436.1 *Departmental Sustainability*.

In FY 14, Jefferson Lab advanced a Utility Energy Services Contract (UESC) program to finance energy and water efficiency projects and continue progress towards achieving its sustainability goals. To date, the utility selection process, and the Preliminary Audit phase have been completed. The utility selected, AGL Energy Services, a unit of the parent company of Virginia Natural Gas (local utility provider), has completed the data collection, facility operations survey activities and Preliminary Audit Report to develop a set of potential UESC projects. Initial Energy Conservation Measures (ECMs) are focused on projects to reduce Energy Utilization Intensity (lighting system and building automation upgrades), central chilled water plant efficiency improvements, and water reduction (domestic water/low flow fixtures) in several administrative facilities and industrial water capture and reuse applications. Plans are under development to advance the UESC to the Feasibility Study phase in FY 15, and subsequently issue task orders to begin implementation of the most favorable ECMs. When implemented, the identified ECMs will contribute especially to achieving the Energy Utilization Intensity goal (30% reduction by FY 15), water intensity reduction, and the HPSB Guiding Principle compliance goal. Although the Preliminary Audit was comprehensive in scope, from chilled water plant to LED lighting fixture ECMs, Jefferson Lab and AGL Energy Services will continue an ongoing relationship to investigate and develop additional UESC projects, beyond the initial scope.

Further, Jefferson Lab is engaged in a regional alternative energy generation initiative with the Newport News/Williamsburg International Airport, City of Newport News and other stakeholders to develop a resilient and secure energy program for the Hampton Roads region. This program has the potential to provide a cost effective and significant quantity

of low GHG content energy to help satisfy Jefferson Lab's projected increased electricity requirements, and provide a source of non-potable water (rain water harvesting) for projected increasing cooling tower needs.

As a High Energy Mission Specific Facility (HEMSF), Jefferson Lab's recent expansion of scientific and support facilities will result in significantly increased electrical and thermal energy requirements. Consequently, achievement of the SSPP Scope 2 emission reduction target (purchased electricity) represents a significant challenge. Electricity requirements and related power costs for 12 GeV operations starting in FY 15 are projected to nearly double from the FY 08 baseline.

Major reduction of Scope 2 GHG emissions from purchased electricity requires implementation of a combined set of strategies, including:

- Alternative regional and/or on-site low GHG electricity generation and HEMSF and support facilities energy demand reduction projects
- Electric Utility Renewable Portfolio Standard Achievement of Reduced GHG emissions per Mwh of electric generation
- Renewable Energy Credits and/or Green Power Purchasing Agreement

As the Jefferson Lab scientific mission continues to expand, thermal energy (cooling tower water) requirements for accelerator operations are also projected to significantly increase. Similar to the projected electricity increases from 12 GeV operations, Jefferson Lab's water requirements are estimated to double from the FY 07 baseline of 50 MGal. Approximately 75% of Jefferson Lab's annual consumption of potable water is primarily consumed in cooling tower operations (evaporation/blow down).

Multiple alternative water reduction strategies are under consideration. Two independent consulting firms and a water assessment team from Pacific Northwest National Laboratory (PNNL) conducted on-site water consumption analysis surveys throughout FY 12 and FY 13. Water intensity reduction plans are designed to provide alternative water sources to primarily satisfy thermal energy (cooling tower water) requirements. Potential strategies include, Ultra-Pure Water (UPW) system discharge, capture and reuse. Design of the UPW reject water project is complete and awaiting funding. A consultant is developing a concept to prototype capturing, storage, treatment and distribution of roof and storm water. A combination of these strategies and domestic water reductions (low flow fixtures) are required for Jefferson Lab to achieve the challenging 26% water reduction goal.

Table 1 summarizes Jefferson Lab's current performance status, planned actions and risk of non-attainment (High / Medium / Low). The "Performance Review and Narrative" section of this document provides both narrative detail and data to support the Table 1 summary and Jefferson Lab's progress regarding all SSPP goals.



**Table 1 - DOE Goal Summary Table**

<b>SSPP Goal #</b>	<b>DOE Goal</b>	<b>Performance Status</b>	<b>Planned Actions &amp; Contribution</b>	<b>Risk of Non-attainment</b>
<b>GOAL 1: Greenhouse Gas Reduction and Comprehensive Greenhouse Gas Inventory</b>				
<b>1.1</b>	28% Scope 1 & 2 GHG reduction by FY 2020 from a FY 2008 baseline (2014 target: -19%)	Scope 1 & 2 GHG levels were reduced (18.9%) compared to the FY '08 baseline due to an extensive accelerator and related operations shutdown period in FY '13 / FY '14.	<b>Scope 1</b> maintain successful fugitive and vehicle emission reduction practices <b>Scope 2</b> (electricity) requires multiple supply & demand strategies to achieve reduction targets	M
<b>1.2</b>	13% Scope 3 GHG reduction by FY 2020 from a FY 2008 baseline (2014 target: -5%)	Scope 3 GHG = 7.7% decrease vs. FY '08 primarily from reduce HEMS operations and subsequent decreased T&D losses	Implement commuting emissions reduction program to reduce controllable Scope 3 GHG emissions.	M
<b>GOAL 2: Buildings, ESPC Initiative Schedule, and Regional &amp; Local Planning</b>				
<b>2.1</b>	30% energy intensity (BTU per gross square foot) reduction by FY 2015 from a FY 2003 baseline (2014 target: -27%)	Energy Intensity Utilization (EIU) reduction is 27.8% to date vs. FY '03 baseline	Existing building ECMs identified to reduce EIU and low BTU / Sq. Ft. bldg. renovation projects on schedule prior to FY '15	L
<b>2.2</b>	EISA Section 432 energy and water evaluations	Approximately 59% of required energy and water evaluations completed in the current 4 year EISA audit cycle.	Continue annual energy and water audits and benchmarking to complete 100% by June 2016 (EISA cycle deadline)	L
<b>2.3</b>	Individual buildings metering for 90% of electricity (by October 1, 2012); for 90% of steam, natural gas, and chilled water (by October 1, 2015) (2014 target: 90% and 75%, respectively)	Completed installation of Advanced Metering System for all individual building level and processes for electric, natural gas, and water.	Metering goal achieved. Additional metering to be installed for new construction and future renovation projects as appropriate.	L
<b>2.4</b>	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.	Approximately 78% (446K Sq. Ft.) of total applicable site roof area (5,68K Sq. Ft.) comply with cool roof requirements to date.	Additional Sq. Ft. of cool roof upgrades to continue as roof replacements occur.	L
<b>2.5</b>	15% of existing buildings greater than 5,000 gross square feet (GSF) are compliant with the Guiding Principles (GPs) of HPSB by FY 2015 (2014 target: 13%)	Completed 13% of existing building compliance with HPSB Guiding Principles (number of goal subject buildings = 15)	Building renovation project in progress to achieve HPSB compliance and meet 15% goal	L
<b>2.6</b>	All new construction, major renovations, and alterations of buildings greater than 5,000 GSF must comply with the GPs	Completed two new construction, major renovation projects certified at LEED Gold /compliant with HPSB GPs	Building renovations completed in FY '15 designed to achieve HPSB compliance goal of 15% of existing buildings >5K GSF.	L
<b>2.7</b>	Efforts to increase regional and local planning coordination	Jefferson Lab is engaged with regional organizations to advance alternative energy use and sustainability initiatives		

**Table 1 - DOE Goal Summary Table (cont'd)**

<b>SSPP Goal #</b>	<b>DOE Goal</b>	<b>Performance Status</b>	<b>Planned Actions &amp; Contribution</b>	<b>Risk of Non-attainment</b>
<b>GOAL 3: Fleet Management</b>				
<b>3.1</b>	10% annual increase in fleet alternative fuel consumption by FY 2015 relative to a FY 2005 baseline (2014 target: 90% cumulative since 2005)	Fleet annual alternative fuel consumption (E-85) increased to 3,795 (GEG) in FY '14, approximately 603% above the FY 2005 baseline, exceeding the 10% annual goal.	Jefferson Lab has exceeded the FY 2015 goal.	L
<b>3.2</b>	2% annual reduction in fleet petroleum consumption by FY 2020 relative to a FY 2005 baseline (2014 target:18% cumulative since 2015)	Fleet annual petroleum consumption decreased to 2,380 gallons in FY '14, approximately 45% below the FY 2005 baseline, exceeding the 2% annual reduction goal.	Jefferson Lab has exceeded the FY 2020 goal.	L
<b>3.3</b>	100% of light duty vehicle purchases must consist of alternative fuel vehicles (AFV) by FY 2015 and thereafter (75% FY 2000 – 2015)	Light Duty Fleet = 10 Vehicles Light Duty AFV = 10 vehicles 100% of Light Duty Fleet AFV	Jefferson Lab has achieved the FY 2015 goal.	L
<b>GOAL 4: Water Use Efficiency and Management</b>				
<b>4.1</b>	26% potable water intensity (Gal per gross square foot) reduction by FY 2020 from a FY 2007 baseline (2014 target: 14%)	Water intensity (Gallons / GSF) decreased by approximately 23% in FY '14 vs. the FY 2007 baseline. FY '07 (63.8 Gallons / GSF) vs. FY '14 (49.5 Gallons /GSF).	Water intensity reduction plans include alternative cooling tower water source strategies (process water capture, rain, ground and condensate water harvesting. Domestic water reduction strategies include installation of low flow fixtures.	M
<b>4.2</b>	20% water consumption (Gal) reduction of industrial, landscaping, and agricultural (ILA) water by FY 2020 from a FY 2010 baseline (2014 target:8%)	N/A, non-potable water sources not used.	Future use of ILA water is not included in future water use plans.	L
<b>GOAL 5: Pollution Prevention and Waste Reduction</b>				
<b>5.1</b>	Divert at least 50% of non-hazardous solid waste, excluding construction and demolition debris, by FY 2015	Annual non-hazardous solid waste diverted from landfill / recycled = 78.4%.	Continue current best practices that exceed the 50% diversion goal.	L

**Table 1 - DOE Goal Summary Table (cont'd)**

<b>SSPP Goal #</b>	<b>DOE Goal</b>	<b>Performance Status</b>	<b>Planned Actions &amp; Contribution</b>	<b>Risk of Non-attainment</b>
5.2	Divert at least 50% of construction and demolition materials and debris by FY 2015	Annual construction materials diverted from landfill / recycled = 81.1%	Continue current best practices that exceed the 50% diversion goal.	L
<b>GOAL 6: Sustainable Acquisition</b>				
6.1	Procurements meet requirements by including necessary provisions and clauses (Sustainable Procurements / Bio based Procurements)	FAR clauses regarding sustainability included in all appropriate acquisition contracts	Continue current best practices that achieve 95% goal. Implement measurement procedures in FY '14 to assure annual 95% compliance	L
<b>GOAL 7: Electronics 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 (2014 target: 90%)	Installed electric and BTU meters on primary data center in FY '14 to measure 90% of total PUE.	Consolidate two data centers as included in the 10 year data center plan and measure 100% PUE.	L
7.2	Maximum annual weighted average PUE of 1.4 by FY 2015 (2014 target: 1.50)	Current calculated weighted average PUE value for two data centers = 1.79	Implement ECMs included in a 10 year infrastructure and data center plan.	L
7.3	Electronic Stewardship - 100% of eligible PCs, laptops, and monitors with power management actively implemented and in use by FY 2012	Power management system actively manages 100% of PC's and monitor hibernation mode.	Continue current practices that achieve the power management goal.	L
<b>GOAL 8: Renewable Energy</b>				
8.1	20% of annual electricity consumption from renewable sources by FY 2020 (2014 target: 7.5%)	Purchased Renewable Energy Credit (RECs) certificates in FY ' 14 equal to 8.8% of total Mwh electric consumption vs. 7.5% goal.	Purchase RECs in FY '15 equal to 10% of total electric use, and increase to 20% by FY 2020.	L
<b>GOAL 9: Climate Change Adaptation</b>				
9.1	Climate Change Adaptation - Address DOE Climate Adaptation Plan goals	Completed Climate Vulnerability Screening Assessment in FY '14		
<b>GOAL 10: Energy Performance Contracts</b>				
10.1	Utilization of Energy Performance Contracts	Completed UESC Preliminary Audit and evaluated projects to advance to Feasibility Study phase.		

## II Performance Review and Plan Narrative

### **Goal 1.1 28% Scope 1 and 2 GHG Reduction by FY '20 from FY 08 Baseline**

#### 1.1.1 Performance Status

Scope 1 and 2 emissions to date have decreased from FY 08 due primarily to accelerator and Free Electron Laser operation reductions in FY 14. Fleet Petroleum emissions have decreased in FY 14 compared to FY 08 from increased alternative fuel (E-85) consumption and reduced gasoline use. Scope 2 emissions have decreased significantly compared to FY 08, again due primarily to accelerator operations shutdown during the construction and commissioning of Jefferson Lab's accelerator upgrade from 6 GeV to 12 GeV, contributing to a combined Scope 1 and 2 decrease of approximately 19% compared to the FY 08 baseline. However, as accelerator operations resume in FY 15 and increase to full 12 GeV levels in subsequent years, Scope 2 emissions will nearly double compared to FY 08 until the planned multiple reduction strategies reach full implementation.

#### 1.1.2 Plans, Actions and Projected Performance

##### Scope 1

As indicated in Table 2, Scope 1 GHG emissions have a minimal impact on Jefferson Lab's total GHG emission content. A successful SF6 capture program will continue to minimize fugitive emissions; energy efficiency strategies will limit natural gas emissions from building heating systems, and increased alternative fuel use will enable Jefferson Lab to maintain low vehicle and equipment emission levels.

##### Scope 2

As indicated in the Executive Summary Section, significant projected increases in Scope 2 electricity will require multiple strategies, including alternative (low GHG) electricity sources, innovative HEMS efficiency improvements projects, conventional ECMs, and REC purchases to achieve the 28% GHG emissions reduction goal.

**Table 2 - Scope 1 and 2 GHG Emissions FY 08 – FY 13**

Scope 1 GHG Fugitive Emissions, Natural Gas, Fleet Petroleum (gas/diesel/E-85) Emissions

	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	
Scope 1 GHGs	FY 08	FY 14	Difference	% Change
<b>Fugitive Emissions</b>	1,821.26	2,840.5	+1,019.24	+55.9%
<b>Natural Gas</b>	1,121.25	1,300.23	+178.98	+15.9%
<b>Fleet Petroleum</b>	53.47	20.6	<b>-32.87</b>	<b>-61.4%</b>
<b>Total Scope 1</b>	2,995.98	4,161.33	+1,165.35	+38.9%

Scope 2 GHG Emissions, Purchased Electricity

	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	
Scope 2 GHGs	FY 08	FY 14	Difference	% Change
<b>Electricity</b>	64,707.6	50,732.57	<b>-13,975.03</b>	<b>-21.6%</b>

Scope 1 and 2 GHG Combined

	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	
	FY 08	FY 14	Difference	% Change
<b>Scope 1</b>	2,995.98	4,161.33	+1,165.35	+38.9%
<b>Scope 2 (Electricity)</b>	64,707.6	50,732.57	-13,975.03	-21.6%
<b>Total Scope 1 &amp; 2</b>	67,703.6	54,893.9	-12,809.7	-18.9%

**Goal 1.2 13% Scope 3 GHG Reduction by FY 20 from FY 08 Baseline**

*1.2.1 Performance Status*

Table 3 defines Scope 3 GHG emissions by category for FY 14 compared to FY 08 baseline. As indicated, except for staff commuting and business travel emissions, other “controllable” Scope 3 emissions are stable or declining, and have minimal contribution opportunity to achieve a 13% reduction goal. Achieving the Scope 3 reduction goal will primarily rely on implementing a successful staff commuting emissions reduction program. Designated carpooling and low emission vehicle parking spaces were implemented in FY 13 and FY 14.

**Table 3 – Scope 3 GHG Emissions**

	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	
Scope 3 GHGs	FY 08	FY 14	Difference	% Change
<b>T&amp;D Losses</b>	*4,258	*3,730	-528	-12.4%
<b>Staff Commuting</b>	1,374	2,024	+650	+47%
<b>Business Air Travel</b>	856	913	+57	+6.6%
<b>Business Ground</b>	135	74.4	-60.6	-44.8%
<b>Off-Site Landfill</b>	348	81.9	-266.1	-76.4%
<b>Off-site Wastewater</b>	4	4.2	.2	5%
<b>Total Scope 3</b>	<b>6,975</b>	<b>6,827.5</b>	<b>-147.5</b>	<b>-2.1%</b>

\*T&D Losses = actual utility reported T&D loss percentage (3.783%) compared to national (6.587%) average used in Table 3 and CEDR calculations.

*1.2.2 Plans, Actions and Projected Performance*

Staff commuting emissions are the single largest (controllable) contributor to Scope 3 emissions. Limited public transportation alternatives are available to the Jefferson Lab location. Subsequently, Jefferson Lab Human Resources organization is developing an alternative work schedule program to implement in FY '15. Also, a telework strategy is under consideration to complement the alternative work schedule program, and further reduce overall Scope 3 emissions from staff commuting sources.

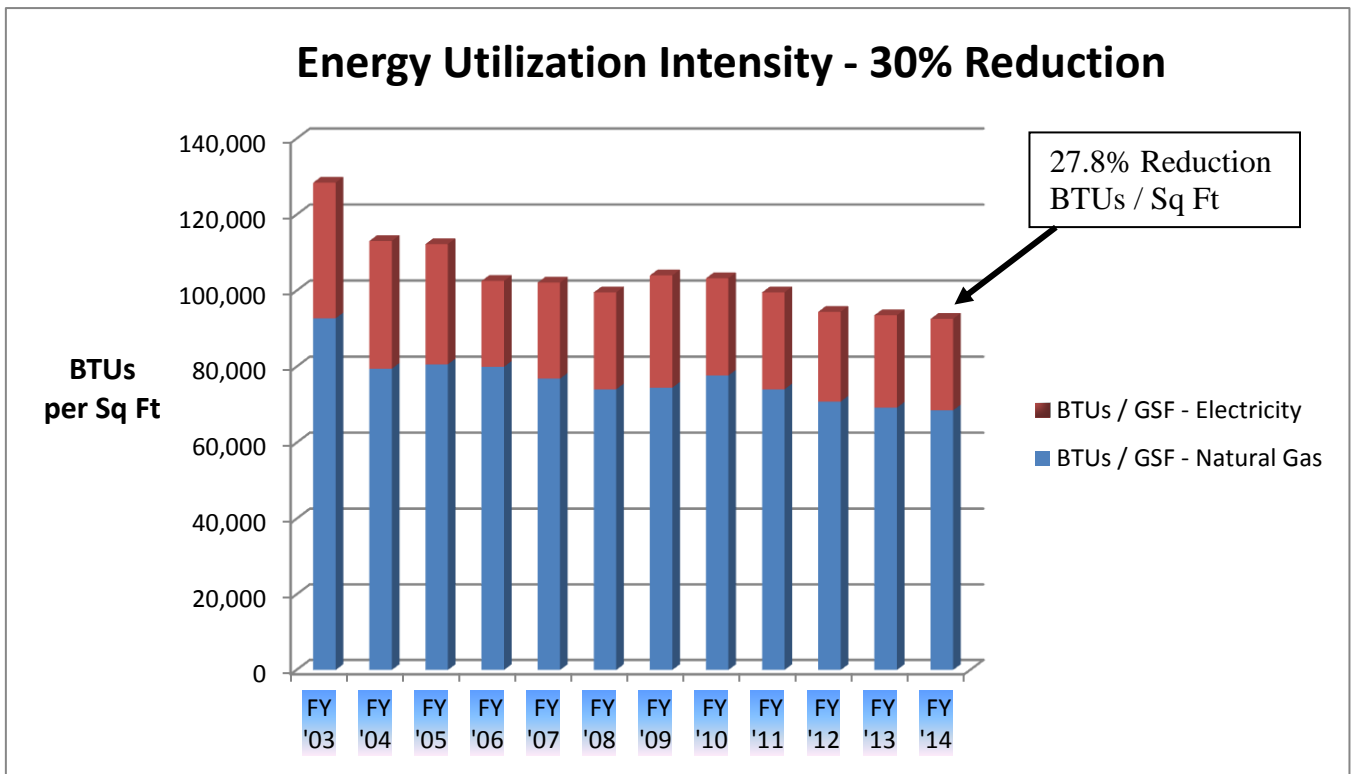
Transmission and Distribution (T&D) losses that contribute to Jefferson Lab’s total Scope 3 emissions would be approximately one half of the value indicated in Table 3 for FY '14 (and subsequent years) if the actual utility rate T&D loss percentage (3.78%) as calculated by the local

utility organization (Dominion VA Power) was applied to Jefferson Lab’s annual electricity (Kwh) consumption rate.

**Goal #2: Buildings, ESPC Initiative Schedule, and Regional Planning**

**Goal 2.1 30% Energy Intensity Reduction by FY 15 from an FY 08 Baseline**

**Chart 1 - Energy Utilization Intensity**



**2.1.1 Performance Status**

Jefferson Lab’s current Energy Utilization Intensity (EUI) in FY 14 was 92,595 BTUs/Square Foot, which is a 27.8% reduction (*Chart 1*) as compared to the FY 03 baseline of 128,442 BTUs/Square Foot. Jefferson Lab is on schedule to meet the 30% reduction goal by 2015.

**2.1.2 Plans, Actions and Projected Performance**

Jefferson Lab plans to implement Energy Conservation Measure (ECM) projects in existing buildings and implement energy efficiency strategies in several building renovations prior to FY 15 end that will significantly reduce EUI to achieve the 30% reduction goal.

Potential EUI reduction projects in FY 15, included in a Utility Energy Services Contract target:

- Central Chilled Water System Efficiency Improvements
- Interior and Exterior Lighting Upgrades
- Advanced Building Automation Controls



## **Goal 2.2 EISA Section 432 Energy and Water Evaluations**

### ***2.2.1 Performance Status***

Energy and water audits were conducted during the development of a UESC Preliminary Audit in FY 13 and FY 14. Site-wide industrial water audits were completed in FY 13 by two independent consultants and a water assessment team from PNNL. Results from these audits are under consideration for implementation. Energy audits for approximately 59% of covered facilities and benchmarking updates in Portfolio Manager were also completed during the first and second years of the current 4-year EISA Section 432 cycle.

### ***2.2.2 Plans, Actions and Projected Performance***

Complete the balance of energy and water evaluations (approximately 20% per year of covered facilities) and benchmarking. Utilize UESC Feasibility Study to supplement independent audit activity to achieve the 100% energy, water and benchmarking goal by the current EISA Section 432 deadline of June, 2016.

## **Goal 2.3 Individual Buildings Metering for 90% of Electricity (by Oct 1, 2012), 90% of Purchased Steam, Natural Gas and Chilled Water (by Oct 1, 2015)**

### ***2.3.1 Performance Status***

Jefferson Lab invested significantly during FY 11 (and subsequent years) to complete an advanced Energy Metering and Management System (EMMS) that exceeds goal deadlines for electric, natural gas and water metering. Currently, 100% of the connected electrical load, natural gas service, and water supply are connected to the EMMS. Jefferson lab does not purchase steam or chilled water.

The EMMS includes a Graphical User Interface (GUI) for system navigation, a high level dashboard for frequent monitoring of energy and water consumption on a building and sub-system basis, and an open Tridium Energy Analysis software package for detailed trending and historical analysis of energy and water operations.



### ***2.3.2 Plans, Actions and Projected Performance***

Additional building level metering of energy, natural gas and water is scheduled for installation and integration into the EMMS as new construction projects are completed. All existing High Performance Sustainable Building target facilities are connected to the EMMS and collect data to profile each building with Energy Star Portfolio Manager and measure compliance with guiding principles goals.

**Goal 2.4 Cool Roofs, Unless Uneconomical, for Roof Replacements Unless Project Already has CD-2 Approval**

**2.4.1 Performance Status**

Approximately 78% (446K GSF) of the total applicable site cool roof area (568K GSF) complies with cool roof requirements. Jefferson Lab is tracking all of its future cool roof activities in the FIMS database. Building renovation and roof replacement projects completed in FY 14 contributed an additional 35K GSF of cool roof to the Jefferson Lab cool roof inventory vs. FY 13.

**2.4.2 Plans, Actions and Projected Performance**

Additional Sq. Ft. of cool roof upgrades will continue as roof replacements occur (exact schedule TBD). All new construction roofs will include compliance with cool roof requirements.

**Goal 2.5 15% of Existing Buildings Greater than 5K Gross Square Feet (GSF) are Compliant with the Guiding Principles (GP) of High Performance Sustainable Buildings (HSPB) FY '15**

**2.5.1 Performance Status**

Jefferson Lab's initial High Performance Sustainable Building complying with the Guiding Principles was completed in FY 12. A 74,000 Sq. Ft. new construction office and laboratory project, the Technology and Engineering Development (TED) Building earned LEED Gold certification and includes many energy, water efficiency and sustainable features:

***Technology and Engineering Development Building***



**Energy and Water Efficiency**

- Geothermal Heat Pump System provides 80% of HVAC requirements
- Greywater Reuse system delivers 100% of sanitation water
- Solar thermal/domestic water heating system
- 44% Potable water reduction/low flow plumbing fixtures

In FY 13, Jefferson Lab completed its second new construction/major renovation project, designed to achieve LEED Gold certification. This most recent project, the Test Lab, included renovation of an existing 95,000 Sq. Ft. laboratory facility and addition of 43,600 Sq. Ft. laboratory and office area. The Test Lab facility earned LEED Gold certification in FY 14, and subsequently qualifies for Jefferson Lab's second facility to comply with the HPSB Guiding Principles.





### *2.5.2 Plans, Actions and Projected Performance*

Future HPSB GP compliant facilities will be achieved through planned building renovations (i.e.: Accelerator Maintenance Support/Bldg. #87), designed to achieve compliance. Further, when implemented, Energy Conservation Measures identified in the UESC program will contribute to multiple administrative buildings' compliance with HPSB GPs (i.e.: CEBAF Center / Bldg. #12, Accelerator Tech Support/Bldg. #89, Physics Storage/Bldg #72). These renovation and UESC-funded retrofit projects will ensure Jefferson Lab's achievement of the HPSB GP goal (compliance of 15% of existing facilities greater than 5,000 square feet by FY 15 end).

### ***Goal 2.6 All New Construction, Major Renovations and Alterations of Buildings Greater Than 5K GSF must Comply with GPs***

#### *2.6.1 Performance Status*

As indicated in Goal 2.5, in FY 13, Jefferson Lab completed a new construction/major renovation project (Test Lab and Test Lab Addition) that was designed and constructed to achieve LEED Gold certification, and subsequent compliance with HPSB Guiding Principles. The Test Lab/Test Lab Addition project earned LEED Gold certification in FY 14 and subsequent compliance with HPSB Guiding Principles. Two additional renovation/alteration projects in facilities greater than 5K GSF were completed or partially completed in FY 13 (Machine Control Center/Bldg. #85, and Counting House/Bldg. #97). Both of these projects are candidates for compliance with HPSB Guiding Principles following subsequent evaluation.

#### *2.6.2 Plans, Actions and Projected Performance*

Compliance with HPSB Guiding Principles is the basis of design for all applicable Jefferson Lab new construction and/or major renovation. One new renovation project, a 6,700 Sq. Ft. Accelerator Maintenance Support Facility (Bldg. #87), designed and constructed to include many sustainability features and eventual compliance with HPSB GP compliance in FY 15.

### ***2.7 Regional and Local Planning***

Jefferson Lab is engaged in a regional alternative energy generation project with the Newport News/Williamsburg International Airport, City of Newport News and other stakeholders to develop a resilient and secure energy program for the Hampton Roads region.

**Mission Statement:** The implementation of a resilient energy and security program for the Hampton Roads region, beginning with Jefferson Lab, utilizing the available land at the Newport News/Williamsburg International Airport.

**Project Scope:** A comprehensive technical and financial solution to meet the energy, water and security requirements of Jefferson Lab and the Newport News/Williamsburg International Airport was developed through a Value Engineering Study in September 2013.

#### **Project Objectives:**

- Meet one hundred percent (100%) of the critical electrical load requirements at both Jefferson Lab and the Newport News Airport with secure, resilient energy that is more efficient and produces less carbon. The total critical load is twelve (12) megawatts (CHL).
- Reduce the potable water requirements of Jefferson Lab by sixty percent (60%).

- Increase the security footprint at each facility and emergency response coordination in the region.

**Project Design:** The proposed project will be constructed in two phases.

- **Phase 1.** Install eighteen megawatts (18 MW) of natural gas turbines, a six megawatt (6 MW) solar array and a fifty (50) million gallon rain water collection capability at the Newport News Airport. The infrastructure required to deliver the electricity and rain water to Jefferson Lab utilizing either Dominion Power or the City of Newport News' right-of-way will be constructed. A comprehensive security study will be done at the airport and Jefferson Lab. Approximately five million dollars (\$5M) worth of enhancements will be made at the airport based on the study's findings and the airport's needs. The security investment at Jefferson Lab has not yet been determined and may not be required. Finally, the project leads will conduct a geothermal energy feasibility study at the Newport News Airport in conjunction with the Commonwealth of Virginia's Division of Geology and Mineral Resources, the US Geological Survey, other private sector and academic partners.
- **Phase 2.** Convert all natural gas turbines to geothermal turbines and expand the generation capacity to meet the region's electrical requirement with clean, secure and resilient power.
  - Several independent studies have been completed that indicate a geothermal resource may exist in the Hampton Roads region.
  - The program leads have conferred with the Virginia Division of Geology and Mineral Resources, Department of Mines, Minerals and Energy and the US Geological Survey to confirm the potential for large-scale geothermal energy.
  - Several private sector partners such as Google have expressed an interest in exploring the potential of large-scale geothermal energy in the Hampton Roads region. To date, five hundred thousand dollars (\$500K) have been committed to the effort.

**Project Benefits:**

- **Phase 1.** Jefferson Lab will meet critical load electrical requirements and nearly meet potable water reduction requirements while achieving budget certainty through a competitive long term Power and Water Purchase Agreement. The Newport News Airport will receive a long term lease for all project lands and revenue for the life of the agreement with Jefferson Lab. In addition, the airport and the city of Newport News will reduce their storm water discharges by fifty (50) million gallons and position themselves as an economic development driver for the region. Finally, the project will reduce the carbon footprint of Jefferson Lab by 8,600 metric tons per year.
- Jefferson Lab, by implementing this project, will be complying with both the Energy Policy Act of 2005 (EPAct 2005) and the Energy Independence and Security ACT of 2007 (EISA 2007) along with subsequent Executive Orders (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management and EO 13514, Federal Leadership in Environmental, Energy and Economic Performance.

- This project will support the Commonwealth of Virginia, the Virginia Chamber of Commerce and Dominion Power in achieving thirty-three (33) goals from the Blueprint Virginia plan that was launched in November 2012.
- **Phase 2.** Both Jefferson Lab and the Newport News Airport will meet one hundred percent (100%) of their electrical requirements with clean, secure and resilient energy. Dominion Power will increase their zero carbon renewable energy portfolio by one hundred to one hundred and fifty megawatts (100-150 MW) depending on the final scope.

### **Goal #3: Fleet Management**

#### **Goal 3.1 10% Annual Increase in Fleet Alternative Fuel Consumption by FY 20 Relative to a FY 05 Baseline**

##### *3.1.1 Performance Status*

Jefferson Lab's annual alternative fuel (E-85) consumption increased to 3,795 Gasoline Equivalent Gallons (GEG) in FY 2014, or approximately 603% above the FY 05 baseline. Subsequently, Jefferson Lab has exceeded both the 2014 progress target and the 10-year goal period.

##### *3.1.2 Plans, Actions and Projected Performance*

As fleet inventory is replaced, the balance of fleet vehicles will include alternative fuel vehicles only. Consequently, Jefferson Lab's fleet will continue to consume alternative fuel, ensuring achievement of the 10% annual increase goal and 100% increase for the 10-year goal period.

#### **Goal 3.2 2% Annual Reduction Fleet Petroleum Consumption by FY 20 Relative to an FY 05 Baseline**

##### *3.2.1 Performance Status*

Jefferson Lab's annual petroleum consumption decreased to 2,380 gallons in FY 14, approximately 45% below the FY 05 baseline. Consequently, Jefferson Lab has achieved both the annual 2% reduction goal and 15-year (FY 05 to FY 20) 30% reduction goal.

##### *3.2.2 Plans, Actions and Projected Performance*

Both a reduction in Jefferson Lab's total vehicle fleet and specifically all gasoline fueled vehicles will assure the decrease in petroleum consumption will continue to a zero level.

#### **Goal 3.3 100% of Light Duty Vehicle Purchases must Consist of Alternative Fuel Vehicles (AFV) by FY 15**

##### *3.3.1 Performance Status*

Jefferson Lab's Light Duty Vehicle fleet consists of twelve (12) vehicles

- (6) Pickup Trucks
- (2) Minivans
- (2) Sedans
- (1) 4X4 Pick-up
- (1) Cargo Van

All Light Duty Vehicles purchased since FY 00 are Alternative Fuel Vehicles

### *3.3.2 Plans, Actions and Projected Performance*

All six light duty vehicles currently scheduled for GSA lease replacement in FY 15 are specified to be alternative fuel vehicles.

## **Goal #4: Water Use Efficiency and Management**

### **Goal 4.1 26% Potable Water Intensity (Gallons per GSF) Reduction by FY 20 from a FY 07 Baseline**

#### *4.1.1 Performance Status*

Water intensity (potable water use per GSF) at Jefferson Lab is primarily (75%) consumed for cooling tower operations and landscape irrigation. Water intensity to date has decreased approximately 23% compared to the FY 07 baseline. However, this reduction was due to an extended shut down period of the Jefferson Lab accelerator during FY 13/FY 14 as upgrade construction occurred. Water required for thermal cooling purposes is predicted to increase significantly in future years as the Jefferson Lab scientific mission and 12 GeV expansion progress to completion.

#### *4.1.2 Plans, Actions and Projected Performance*

Multiple alternative water reduction strategies are under consideration. Cooling tower water requirements represent about 75% of Jefferson Lab's water consumption, and are estimated to approximately double in annual quantity when 12 GeV operations are fully implemented. Consequently, water reduction plans are focused on utilizing alternative water sources, and technology, including UPW discharge reuse, and rain water harvesting (including rain water from the Newport News/Williamsburg International Airport). Design of the UPW reject water project is complete and awaiting funding. A consultant is developing a concept for capturing, storage, treatment and distribution of roof and storm water. As described in the Executive Summary, a combination of the above strategies is required for Jefferson Lab to achieve the 26% water intensity reduction goal by FY 20 goal. Design is underway for reuse of the UPW discharge in our cooling towers.

### **Goal 4.2 20% Water Consumption (Gallons) Reduction of Industrial, Landscape, and Agricultural (ILA) water by FY '20**

#### *4.2.1 Performance Status*

Currently, Jefferson Lab has not utilized non-potable water for industrial, landscaping or agricultural purposes. All water requirements have been satisfied with potable water sources.

#### *4.2.2 Plans, Actions and Projected Performance*

Achievement of the 26% potable water intensity goal may require Jefferson Lab to rely on supplementing previously non-utilized industrial, landscaping, and agricultural (ILA) water sources.

## **Goal #5: Pollution Prevention and Waste Reduction**

### **Goal 5.1 Divert at Least 50% of Non-Hazardous Solid Waste, Excluding Construction and Demolition Debris by FY 15**

#### *5.1.1 Performance Status*

Jefferson Lab aggressively recycles non-hazardous solid waste. Of the 396 tons of non-hazardous solid waste produced in FY 14, approximately 79% or 313 tons of building and office waste, paper and metal were recycled and/or diverted from landfill deposit to a local waste to steam energy conversion plant. *Verification of recycled material quantities is reported by the recycling service center, and recorded by Jefferson Lab.*

*Jefferson Lab Materials Management staff prepares 80K pounds of lead scrap for shipment to a lead smelting and processing company. The Lab has received in return approximately 55K pounds of lead (2,069 lead bricks) that are used for shielding purposes for physics experiments.*



#### *5.1.2 Plans, Actions and Projected Performance*

Jefferson Lab will continue to recycle non-hazardous waste to continue to exceed the 50% recycling goal by FY 15. Further, Jefferson Lab will continue to participate in a waste-to-energy program. Approximately 59 tons of non-hazardous waste in FY 14 was diverted to the local Hampton – NASA steam plant for incineration.

### **Goal 5.2 Divert at Least 50% of Construction and Demolition Materials and Debris by FY 15**

#### *5.2.1 Performance Status*

Construction activity at Jefferson Lab in FY '14 produced approximately 48 tons of construction and demolition materials and debris. Thirty-nine tons of construction material (approximately 81%) was recycled/diverted from landfill deposit.

#### *5.2.2 Plans, Actions and Projected Performance*

Overall construction and demolition materials debris is projected to decline significantly in FY 15 relative to previous years as major new construction activities are completed. Jefferson Lab will continue to recycle construction and demolition materials and debris and is projected to continue to exceed the 50% recycling goal by FY 15.

## **Goal #6: Sustainable Acquisition**

### **Goal 6.1 Procurements Meet Requirement by Including Necessary Provisions and Clauses (Sustainable Procurements)**

#### *6.1.1 Performance Status*

FAR clauses regarding sustainability included in all appropriate acquisition subcontracts.

*6.1.2 Plans, Actions and Projected Performance*

Implement compliance measurement procedures in FY 14 to ensure 95% compliance. Continue current practices to achieve the 95% goal.

**Goal #7: Electronic Stewardship and Data Centers**

**Goal 7.1 All Data Centers are Metered to Measure Monthly Power Utilization Effectiveness (PUE) of 100% by FY 15**

*7.1.1 Performance Status*

Supply power and BTUs of chilled water energy to data centers is currently metered to measure total data center energy. Data center total energy and IT power are metered separately and integrated with a sitewide system with software capable of calculating monthly Power Utilization Effectiveness values.

*7.1.2 Plans, Actions and Projected Performance*

Upgrade metering system dashboard to improve visibility of monthly PUE data. Dashboard software will be included in the data center 10-year upgrade plan.

**Goal 7.2 Maximum Annual Weighted Average PUE of 1.4 of All Data Centers by FY 15**

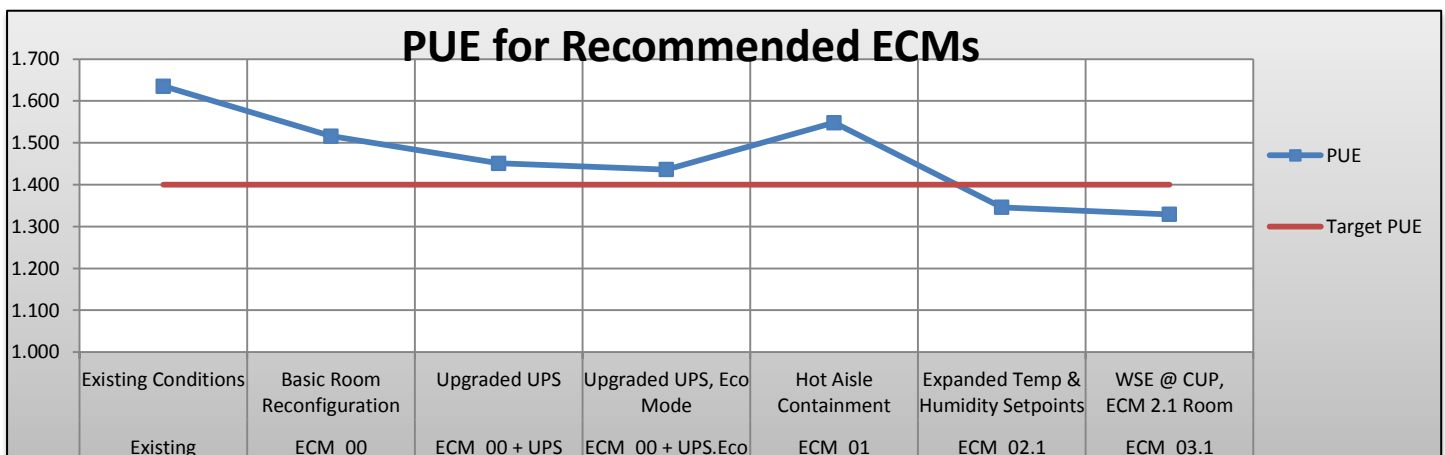
*7.2.1 Performance Status*

Jefferson Lab operates two on-site data centers, with a combined square footage of approximately 9,400. Both centers are located in the same facility and independently electrically powered and served with chilled water and Direct Expansion for Computer Room Air Conditioning (CRAC) unit cooling. The current calculated weighted average Power Utilization Effectiveness value is 1.79. Tier I data center PUE = 1.67. Tier III data center PUE = 1.89.

*7.2.2 Plans, Actions and Projected Performance*

Energy Conservation Measures (ECMs) have been identified in a recently completed study and subsequent 10-year data center plan focused on achieving a weighted average PUE of 1.4. Strategies to achieve the PUE target are indicated in Chart 2 PUE Reduction. Following implementation of ECMs, a Data Center Pro energy assessment will be conducted to determine a more accurate data center profile, and reduced PUE value.

**Chart 2 - PUE Reduction**



This study evaluated the long term plans for the High Performance Computing and CORE Computing systems. Project requirements include consolidation of these two computing systems into one room, achieving a combined PUE below 1.4, upgrading power and cooling infrastructure to meet the five-year and ten-year peak load projections, and coordinating with the ongoing Utility Infrastructure Modernization of communications project which is upgrading fiber optic cabling.

**Goal 7.3 Electronic Stewardship – 100% of Eligible PCs, Laptops, and Monitors with Power Management Actively Implemented by FY 12**

*7.3.1 Performance Status*

Currently, Jefferson Lab utilizes a central power management system for 100% of Windows desktop PCs and monitors that can “hibernate” without impacting Lab mission operations. Laptops are also independently enabled versus centrally power management enabled.

Printing operations are also managed for maximum efficiency. Default queue settings for printers are set for duplex printing in black and white. Users must explicitly select simplex or color printing. Additionally, power management settings on printers/copiers are set to “sleep mode” when idle for a prescribed time period.

*7.3.2 Plans, Actions and Projected Performance*

Continue current practices that achieve the power management goal.

**Goal #8: Renewable Energy**

**Goal 8.1 20% of Annual Electricity Consumption from Renewable Sources by FY 20 (FY 13 Target 7.5%)**

*8.1.1 Performance Status*

Jefferson Lab has and continues to invest and implement renewable energy technologies. Specifically, several existing administrative and industrial facilities, including a newly certified LEED Gold facility on the Jefferson Lab site utilize geothermal heat pump systems. Jefferson Lab installed several exterior solar powered parking lot style lights, and purchased Renewable Energy Certificates (RECs) equivalent to 8.8% of the total Mwh consumption of electricity in FY 14, exceeding the annual 7.5% requirement. RECs purchased for achievement of the LEED Gold (TED) Building included a two-year subcontract for 70% of the building’s estimated annual electricity consumption. REC purchases for achievement of LEED Gold certification for the recently completed Test Lab facility include a two-year subcontract for 35% of the building’s estimated annual electricity use.

*8.1.2 Plans, Actions and Projected Performance*

Purchase RECs in FY 15 and beyond equal to 7.5% of total electric use, and continue to evaluate renewable energy generation sources, on-site or regionally located, to achieve the 20% energy goal from renewable sources by FY 20.

## **Goal #9: Climate Change Resilience**

### **Goal 9.1 Climate Change Resilience**

In FY 14 a team of PNNL sponsored climate scientists, in conjunction with Jefferson Lab staff, completed a comprehensive “Climate Vulnerability Screening Assessment” (assessment) of the lab site, and immediate regional climate conditions. Assessment activities considered a diverse set of information sources, data, and analysis regarding:

- Results of significant historical severe weather events and consequential damages
- Operations and infrastructure vulnerability analysis
- Continuity of utility (power and water) supply exposure
- Potential transportation interruption of Lab staff and critical services
- Effectiveness of emergency preparedness policies and practices
- Impact of potential future increases in precipitation, and temperature variances
- Damage mitigation strategies (tunnel ramp flood gates) currently implemented

The final assessment report (October 2014) observes that *“analysis of past and ongoing impacts of climate extremes, adaptation options already implemented, prospective changes in climate, potential impacts on key internal and external systems, and upcoming expansion/investment decisions have been considered in concluding that Jefferson Lab has shown strong adaptive capacity in response to past climate events”*.

Primarily, site flooding from coastal hurricanes and major rain events represent the most significant forms of climate impact to the Jefferson Lab site. Although the Jefferson Lab site is located in the coastal mid-Atlantic/Hampton roads area, in close proximity to several areas more vulnerable to climate change based sea level rise, the site elevation (34 feet above mean sea level), rising sea levels represent a minimal direct threat to Jefferson Lab. However, considering site operation dependencies external to the Lab site (continuous delivery of liquid nitrogen and helium) and staff access, the assessment report comments that possible roadway transportation interruption is a vulnerability issue to be addressed in future planning. Subsequently, as the assessment report suggests, Jefferson Lab plans to engage The Hampton Roads Transportation Planning Organization who is exploring implications of road transportation vulnerabilities in association with area military installations. Transportation and other concerns associated with climate adaptation will be included in Jefferson Lab’s future planning.

## **Goal #10: Energy Performance Contracts**

### **Goal 10.1 Energy Performance Contracts**

Sustainability funding plans for FY 15, and beyond include implementation of a UESC program. The UESC process has initially identified several Energy Conservation Measures (ECMs) targeting Energy Utilization Intensity (EUI), domestic and industrial use water reduction, and district chilled water system efficiency and distribution improvements.

Summary of UESC/Energy, Water, GHG *Estimated* Savings and EUI Reduction:



Water Savings (Gallons)	Electricity Savings (Kwh)	Natural Gas Savings (MBTU)	Total Energy Savings (MBTU)	CO2 (lbs.)	EUI reduction (MBTU / KSF)
4.5 Million	2,286,900	1,175	1,845	2,242,621	82.7

ECMs Categories (preliminary study list)

- Interior and Exterior Lighting Upgrades
- Low Flow Domestic Water Fixtures
- Central Chilled Water Plant Optimization (waterside economizer)
- Industrial Waste Water Capture and Reuse
- Boiler Control and Building Automation System Optimization
- Rain Water and Daylight Harvesting
- Expanded Economizer Operation
- Kitchen Hood Constant to Variable Volume Control Conversion
- Domestic Hot Water Recirculation Control

**III Fleet Management Plan**

**PURPOSE:** Provide an overview of the structure of Jefferson Lab’s fleet management program and policies that govern procurement, utilization, and disposition.

**FLEET MANAGEMENT ORGANIZATIONAL STRUCTURE**

- Fleet management function is provided by Jefferson Science Associates L.L.C., (JSA) the prime management and operations contractor at Jefferson Lab.
- Organized within the Facilities Management and Logistics Division in the Chief Operating Officer Directorate.
- Facility Services Manager performs the Fleet Manager function with the assistance of an administrator, vehicle/motor equipment/materials coordinator, and a fleet mechanic.
- Federal oversight is provided by the DOE Thomas Jefferson Site Office which is provided guidance by a federal property specialist located at the DOE Oak Ridge Office support center.

**FLEET PROCUREMENT**

- Vehicles are primarily acquired using the GSA leasing program.
- DOE-owned heavy work trucks have been transferred via the DOE excess property system as a cost effective way to acquire special purpose work trucks as a suitable substitute to GSA leasing.
- DOE Contracting Officer authorizes Jefferson Science Associates, LLC to use Government supply sources for the purchase of materials, supplies, equipment, and services required in the performance of JSA’s contract.
- A JSA Facility Services Manager is the designated Fleet Manager on the GSA vehicle lease and is the primary contact for the GSA Fleet Service Representative.
- Additions, replacements, and turn-ins are coordinated with the DOE TJSO Contracting Officer’s Representative in accordance with the Lab’s Mission Essential Vehicle Fleet Size.
- The official fleet size is justified to both the JSA Chief Operating Officer and DOE Site Office Manager, and approved by the DOE Office of Science Deputy Director for Field Operations.

### How are vehicles chosen?

- Collaboratively, with the assistance of lab management, the GSA Fleet Service Representative, and advice of DOE property specialists at both DOE HQ and DOE ORO.
- DOE HQ SC-3 approval is required to increase the size of the Lab's Mission Essential Vehicle Fleet Size.
- JSA Fleet Manager is authorized to replace GSA leased vehicles that fall within the scope of DOE and GSA vehicle replacement criteria.

### **FUEL INFRASTRUCTURE**

#### How does currently available fueling infrastructure dictate vehicle acquisition?

- Only approved alternative fuels are offered in the GSA leasing program.
- Jefferson Lab has its own 1,000 gallon E-85 tank on site.
- Most other alternative fuels offered by GSA are commercially available on the Virginia Peninsula.

### **VEHICLE USE POLICIES**

#### Are there employee check-out standards?

- Must be for "Official" use.
- Must be a Jefferson Lab or Department of Energy payroll employee who is in possession of a current (not suspended) state driver's license.
- Drivers must be age 21 and over to drive off site and age 18 and over to drive on site.
- Authorizations for non-JSA/Jefferson Lab personnel are kept at a minimum consistent with operational necessity; must be justified and approved in accordance with the Jefferson Lab Property Manual.
- Vehicle insurance considerations must be resolved with the Jefferson Lab Risk Manager.
- Training is required in the following areas to check out a vehicle:
  - GEN 400: Local Driving Conditions for Jefferson Lab Fleet Vehicles: Required for all Jefferson Lab government vehicle and motorized equipment drivers.
  - GEN 401kd: E-85 Refueling Procedures: Required for all Jefferson Lab government work truck drivers.
  - SAF 309: Ford Fusion Hybrid Operators Guide: Required for all hybrid electric vehicle drivers.

#### Does the site have an anti-idling policy?

No. However, JLab guards will cite drivers for a violation of JLab policy if a vehicle is left running and unattended.

#### Are drivers provided education on proper driving behavior and fueling requirements?

Local driving conditions familiarization is provided in the following training modules:

- GEN 400: Local Driving Conditions for Jefferson Lab Fleet Vehicles: Required for all Jefferson Lab government vehicle and motorized equipment drivers.
- GEN 401kd: E-85 Refueling Procedures: Required for all Jefferson Lab government work truck drivers.
- SAF 309: Ford Fusion Hybrid Operators Guide: Required for all hybrid electric vehicle drivers.

Jefferson Lab is converting from work trucks to electric utility vehicles for light hauling where possible.

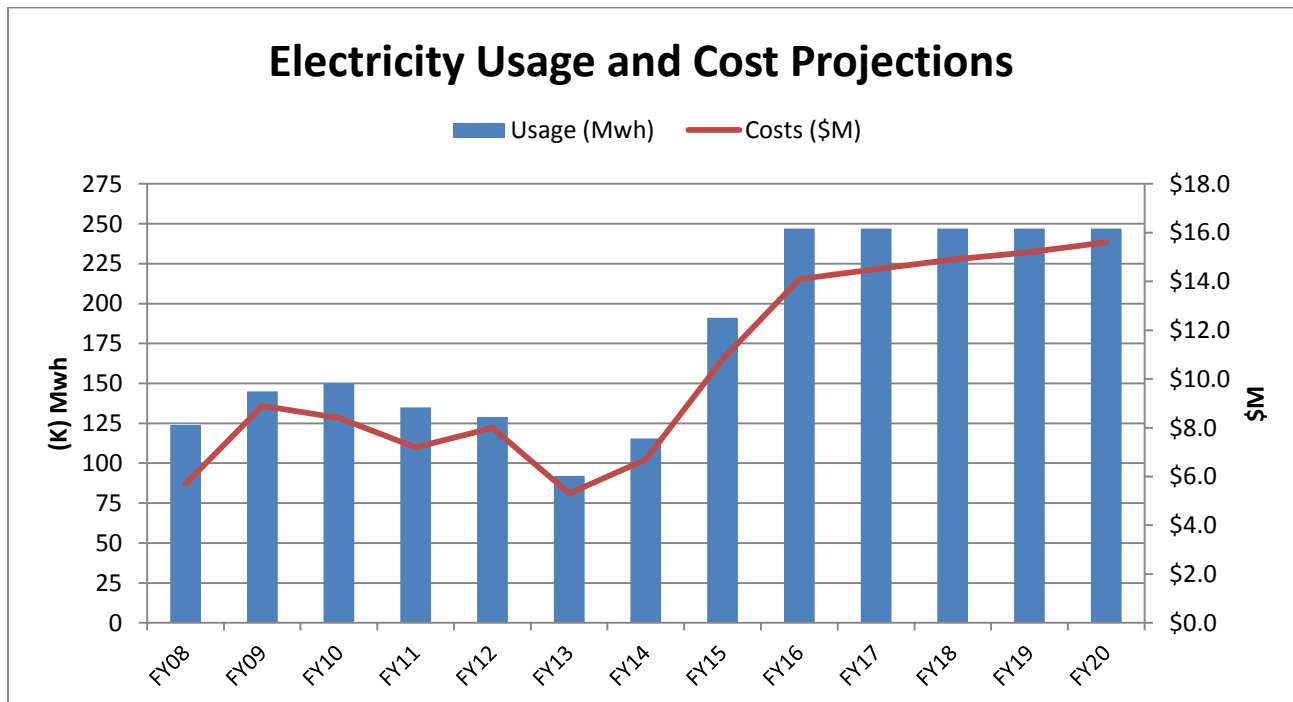
## IV Funding

*Guidance – Provide table of laboratory funding using preferred categories. Include projects whose primary purpose was (or is) sustainability related.*

Jefferson Lab has invested significantly for several years in achievement and/or progress regarding various sustainability goals. Funding was obtained through the sustainable design of two new construction/major renovation LEED Gold facilities. Participation in an ongoing demand response program primarily provided funding for a sitewide metering system, satisfying Jefferson Lab’s complete (electricity, water, and natural gas) metering goal. All new construction and renovation projects include sustainability features designed to continually progress all applicable facilities to achieve compliance with the High Performance and Sustainability Building Guiding Principles. In FY 13, two High Energy Mission Specific Support facilities renovation projects (Test Lab and Machine Control Center) were completed through SLI and GPP funding.

Summary of Sustainability Project Funding (\$K)				
Category	FY 14 Actual	FY 15 Planned	FY 15 Projected	FY 16 Projected
Sustainability Projects	0	400	400	1,850
ESPC/UESC Contract Payments (if applicable)	0	0	0	40
Renewable Energy Credits (REC) Costs	7.4	12	12	18
<b>Total</b>	<b>7.4</b>	<b>12.4</b>	<b>12.4</b>	<b>1,908</b>

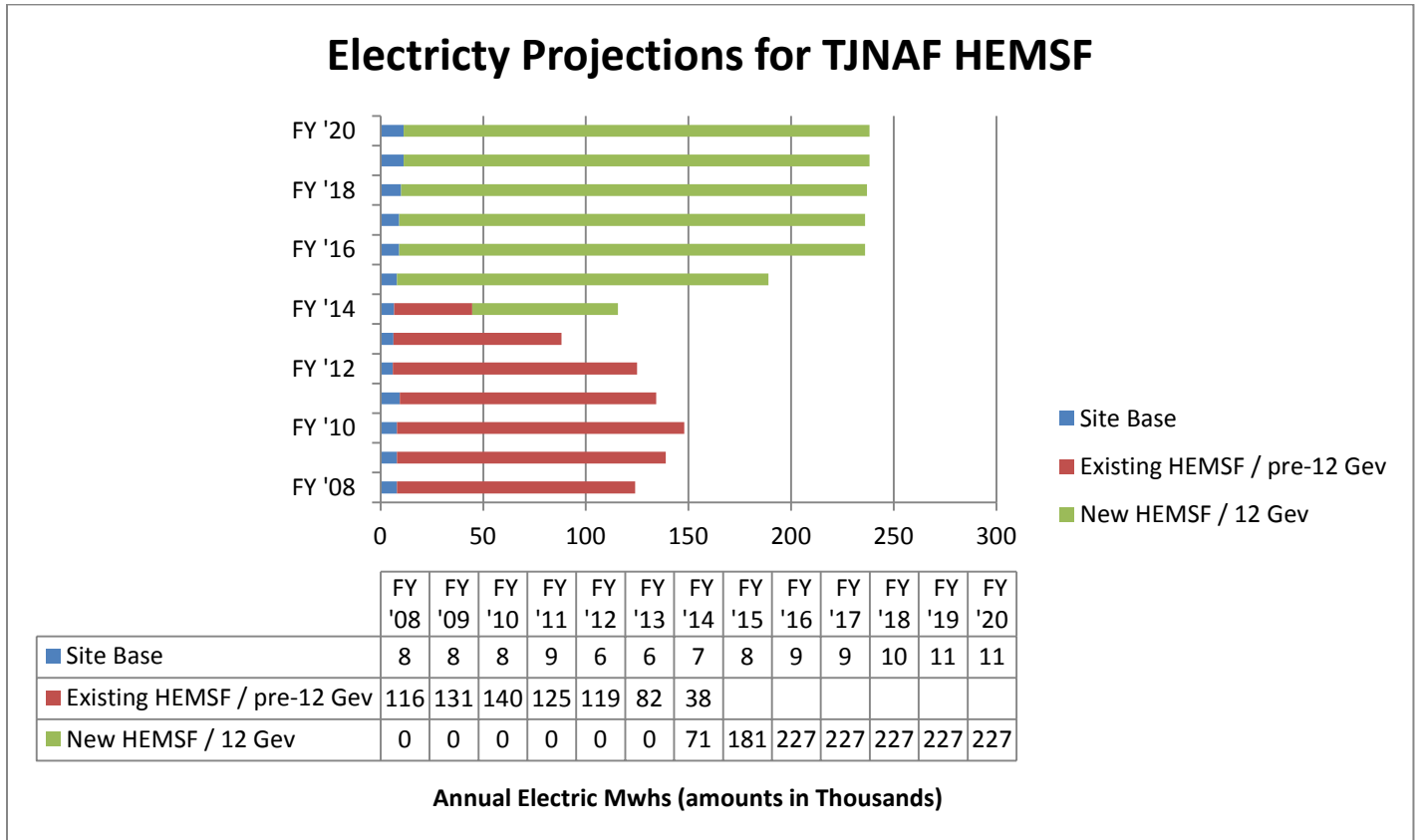
**Electricity Usage and Cost History and Projections (FY 08 – FY 20)**  
Chart 3



## V Electrical Energy Projections and High Energy Mission Specific Facilities (HEMSFs)

Electricity consumption decreased in FY 12 and further in FY 13 due to accelerator shutdown periods required for construction activities regarding Jefferson Lab's 12 GeV upgrade program. Accelerator operations are scheduled to resume in FY 15 to approximately 20 weeks of operation and are planned to increase to approximately 30-35 weeks of operation in subsequent years. Consequently, significant Mwh/year increases are anticipated as indicated in Chart 4:

**Chart 4 HEMSF Electricity Projections**



### High Energy Mission Specific Facilities Description

Jefferson Lab's list of High Energy Mission Specific Facilities (HEMSF) includes all facilities and operations critical to support the scientific mission of the laboratory and qualify as HEMSF. A list of HEMSF and respective FIMS identification is shown in Table 4:

**Jefferson Lab HEMSF qualified facilities, FIMS identification and size (GSF)**

**Table 4 – HEMSF List/FIMS**

Property ID	FIMS Real Property Unique ID	Property Name	Gross SF.
999	137536	Accelerator Tunnel	113,868
08	130258	Central Helium Liquefier (CHL)	21,731
97	130256	Counting House	17,101
39	137579	East ARC Service (E2)	460
49	137580	East ARC Service (E3)	548
63	137582	East ARC Service (E4)	460
50	137581	East ARC Service (E5)	548
102	130260	End Station Refrigeration (ESR)	3,005
104	208920	End Station Refrigeration (ESR) II	6,638
101	141725	Experimental Hall A	34,861
94	141723	Experimental Hall B	17,706
96	141724	Experimental Hall C	28,415
203	210298	Experimental Hall D	11,110
18	134102	Free Electron Laser (FEL)	31,893
91	137539	Hall A Beam Dump Cooling	630
95	137550	Hall C Beam Dump Cooling	630
53	137524	Injector Service	3,402
85	130257	Machine Control Center (MCC)	7,626
67	137567	North Access	8,535
21	137589	North Extractor Service (E1)	460
01	137526	North LINAC	12,850
92	137621	Service Building	2,487
38	137565	South Access	8,535
82	137598	South Extractor Service (W1)	2,289
02	137527	South LINAC	12,850
58	130263	Test Lab	142,345
68	137586	West ARC Service (W2)	1,217
56	137585	West ARC Service (W3)	460
40	137583	West ARC Service (W4)	460
45	137584	West ARC Service (W5)	548

## **VI Integrated Pest Management Program**

Jefferson Lab's pest management subcontract requires all activities comply with environmental guidelines and are in accordance with all federal, state, and local laws regarding pest control services. Subcontractors are required to submit an initial "pest management plan" and provide annual updates for approval. The plan must describe the personnel, equipment, pesticides, quality control measures, schedules and methods of application. Further, pest services providers are required to complete Jefferson Lab training including Environmental Safety and Health Orientation, Activity Hazard Analysis, Security Awareness, and General Employee Radiation Training.