

Ames Laboratory  
FY 2011  
Site Sustainability Plan

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12/28/2010



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# 1. Executive Summary

This plan articulates the Ames Laboratory's commitment to meet the DOE sustainability goals through the projects, tasks, and activities described in the plan. The age of the facilities makes it very challenging to achieve energy efficiency and sustainability in the existing facilities. Four energy conservation projects and a combined energy and water conservation project provide the core strategy to achieve the goals.

The energy conservation projects are estimated to achieve an additional 12% savings through improved energy efficiency while the water conservation project is projected to save 16% compared to baseline data. Ames Laboratory will work to identify and implement additional conservation measures in order to meet goals.

Since the beginning of FY 2009 the Ames Laboratory has successfully retro commissioned nearly 32% of Laboratory spaces.

The funding schedules for the SLI Modernization program have been revised and, as a result, the Metals Development Replacement Building project has been delayed from a FY 2012 start to FY 2017. Therefore energy and sustainability benefits from this project would occur after the DOE target dates. The Laboratory will investigate the feasibility of alternative projects for new facilities that would meet the most critical mission readiness needs, provide significant site sustainability improvements, leave the Metals Development Building in place and have a significantly lower cost than replacing the Metals Development Building.

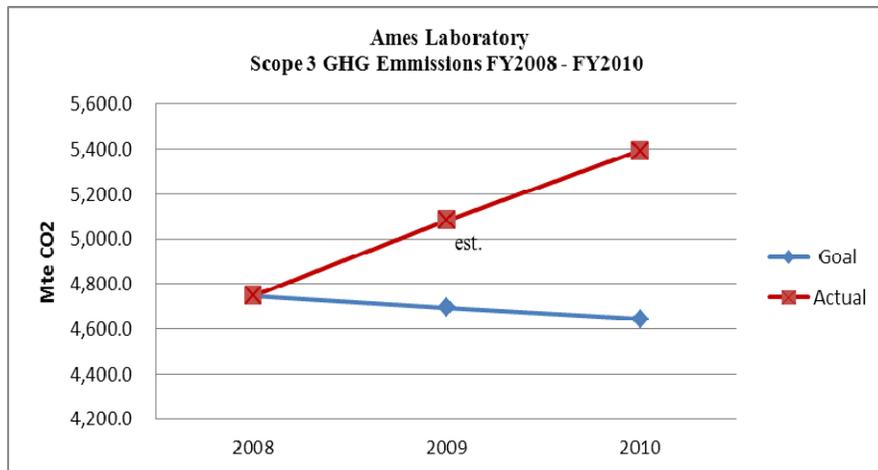
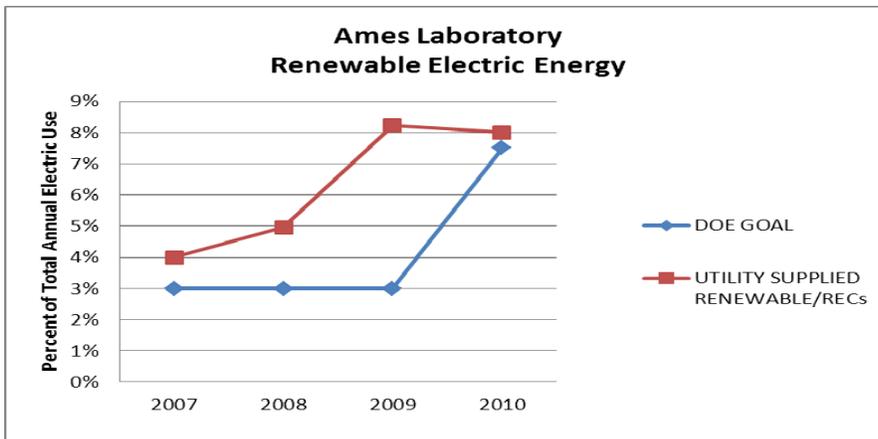
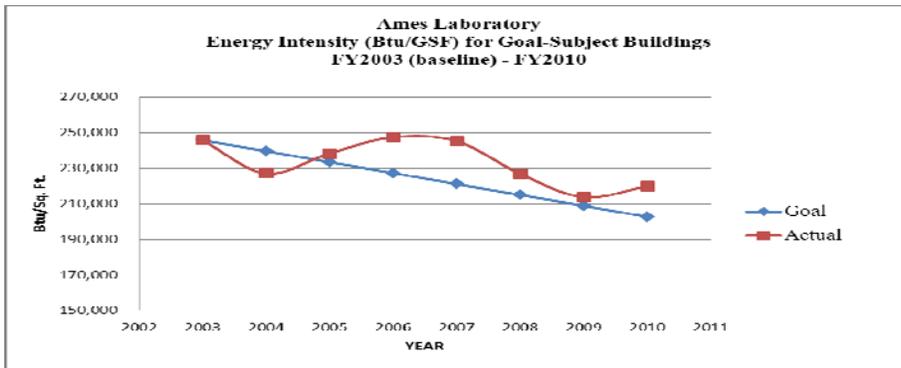
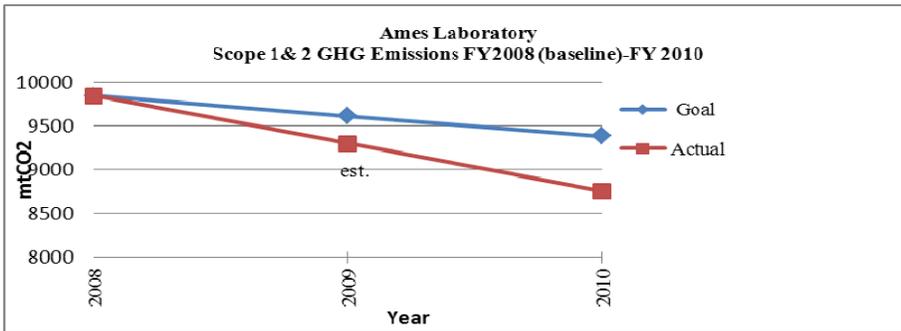
Renewable energy goals have been achieved primarily through the purchase of wind-generated electricity from our local utility and accounting for that power through Renewable Energy Credits. A waiver for the on-site generation of renewable energy has been granted based on the results of a review done by the Energy Service Company (ESCO) which indicated that they were not able to identify any viable on-site generation retrofit projects.

The Ames Laboratory is exempt from Transportation/Fleet Management requirements because of the size of our fleet (four GSA vehicles). However, one of the vehicles is an Alternative Fuel Vehicle (AFV) and the Ames Laboratory increased its usage of AF by 115% from FY 2009 to FY 2010.

The Ames Laboratory completed installation of required advanced electric meters in FY 2010.

Currently 13% of the Ames Laboratory total roof area qualifies as cool roofs.

The sustainability plan outlines the Laboratory's commitment to High Performance and Sustainable Buildings. It describes the steps that will be taken to evaluate and achieve compliance with the guiding principles in 15% of the existing enduring buildings at the site. Ames will also develop a plan to implement the guiding principles in all of the major buildings where it is economically justified. The Laboratory recognizes the requirement for new construction to achieve certification to the LEED Gold Standard and will make that a central requirement in the design and construction of new line-item facilities.



DOE Goal	Performance Status	Planned Actions and Key Issues
28% Scope 1 & 2 GHG reduction by FY 2020 from a FY 2008 baseline (related goals indented below)	Cumulative percent reduction at the end of- FY 10:-11.06% FY 08 Baseline: 9,842.26 mtCO2e FY 20 Goal: 7,086.43 mtCO2e	Complete 2010 inventory and develop priorities.
30% energy intensity reduction by FY 2015 from a FY 2003 baseline	Increased from 213,786 Btu/gsf in FY 09 to 219,963 Btu/gsf at the end of FY 10.  Cumulative percent reduction at the end of- FY 10: 10.5% FY 03 Baseline: 245,734 Btu/gsf. FY 15 Goal: 172,014 Btu/gsf.	Implement energy conservation projects described in the SSP that are estimated to achieve an additional 12% reduction compared to baseline. AL will work to identify and implement additional energy conservation measures in order to meet goals.
7.5% of a site's annual electricity consumption from renewable sources by FY 2010 (2x credit if the energy is produced on-site)	Complete	Continue to purchase RECs to meet requirements.
Every site to have at least one on-site renewable energy generating system by FY 2010	Complete	
10% annual increase in fleet alternative fuel consumption by FY 2015 relative to a FY 2005 baseline	Increased use of AF by 115% from FY 2009 to FY 2010.	Goal not applicable to AL due to the small fleet size. AL will continue to seek opportunities to use AF.
2% annual reduction in fleet petroleum consumption by FY 2015 relative to a FY 2005 baseline	N/A	Goal not applicable to AL due to the small fleet size.
75% of light duty vehicle purchases must consist of alternative fuel vehicles (AFV) by FY 2015	N/A	Goal not applicable to AL due to the small fleet size.
To the maximum extent practicable: advanced metering for electricity (by October 2012), steam, and natural gas (by October 2016); standard meters for water	All utilities metered, electrical with advanced metering.	Continue to review advanced gas & steam meters.
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.	13% of the roofs at Ames Laboratory are Cool Roofs.	As roofs are replaced, use cool roofs unless economically unjustified. Insure R30.
Training and outreach. DOE facility energy managers to be Certified Energy Managers by September 2012.	AL facility energy manager is not a Certified Energy Manager.	Train and certify energy manager by 2012.
Sulfur hexafluoride (SF <sub>6</sub> ) capture program by September 2012.	Utilize ISU SF6 capture program.	Limit future use of SF6 equipment when feasible.
13% Scope 3 GHG reduction by FY 2020 from a FY 2008 baseline	Cumulative percent increase at the end of- FY 10:+13.6% FY 08 Baseline: 4,747.45 mtCO2e FY 20 Goal: 4,130.28 mtCO2e	Develop plan to reduce scope 3 GHG emissions.
All new construction and major renovations greater than \$5 million to be LEED® Gold certified. Meet high performance and sustainable building (HPSB) guiding principles if less than or equal to \$5 million	No new construction or major renovations are currently in process.	Planning for any new construction will include LEED Gold certification or HPSB Guiding principles in the design criteria.
15% of existing buildings larger than 5,000 gross square feet (GSF) to be compliant with the five guiding principles of HPSB by FY 2015	Criterion requires one (1) building at the Ames Laboratory must meet the guiding principles by FY 2015	Building to be evaluated and plan developed in FY 2011.
16% water intensity reduction by FY 2015 from a FY 2007 baseline, 26% by FY 2020	Cumulative percent increase at the end of- FY 10: 13.8% FY 07 Baseline: 14.6 gallons per sf FY 15 Goal: 12.3 gallons per sf	Implement water conservation projects described in the SSP that are estimated to achieve 16% reduction compared to baseline.
20% water consumption reduction of industrial, landscaping, and agricultural (ILA) water by FY 2020 from a FY 2010 baseline	Ames Laboratory does not consume any water for industrial, landscaping, or agricultural use.	N/A

## 2. Goal Performance Review and Plans

### 2.1 Scope 1 & 2 Greenhouse Gas Reduction

#### 2.1.1 Energy Intensity Reduction

EISA 2007 requires DOE to reduce its energy intensity by 30 percent by FY 2015 from a FY 2003 baseline. Sites are expected to aggressively strive towards the overall Departmental goal of a 30 percent reduction, but will not necessarily be held to it, as actual targets will be defined at the DOE Under Secretary level.

##### 2.1.1.1 Performance Status.

#### Energy Intensity

The Bench Mark energy usage established for FY 2003 at the Ames Laboratory is 246,000 Btu/sq. ft. In FY 2009, the Ames Laboratory consumed 213,768 Btu/sq. ft. In FY 2010 the Ames Laboratory consumed 219,963 Btu/sq. ft., a DECREASE of 10.5% compared to FY 2003 consumption and an INCREASE of 2.9% compared to FY 2009 consumption.

Numerous factors influence the level of energy use at the Laboratory, many of these such as weather and utility outages are random, unquantifiable, and beyond the control of the Laboratory. As a significant portion of the energy use at the Ames Laboratory is for environmental control, annual variations in weather can significantly impact energy usage.

#### Retro Commissioning of Existing Buildings

Since the beginning of FY 2009 the Ames Laboratory has successfully retro commissioned 2 existing buildings totaling 32% of the site.

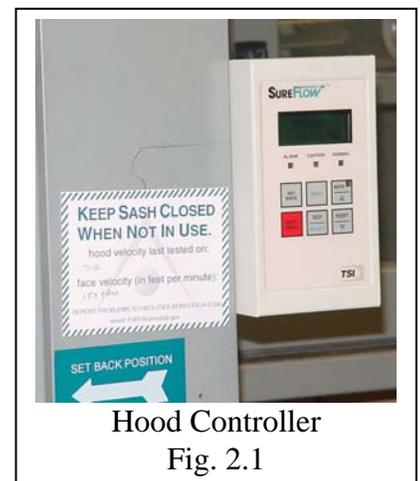
#### Fume Hood Monitoring

Ames Laboratory will continue its hood surveillance program with a goal to further reduce fume hood operational discrepancies in FY 2011.

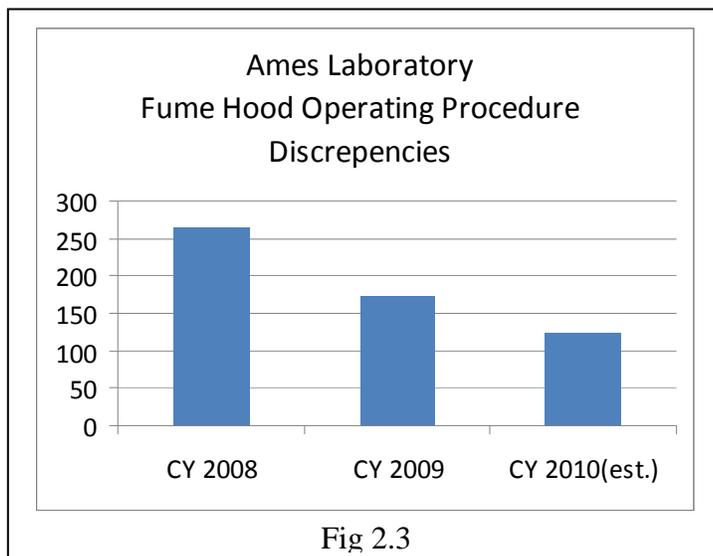
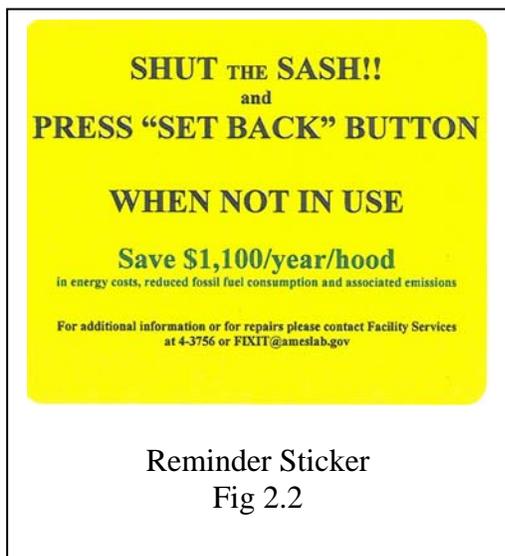
The Ames Laboratory utilizes a variable volume fume hood exhaust system that can provided for significant energy savings when operated properly. New employees are trained in proper operation of the fume hood controllers in General Employee Training and during program specific training. In addition, operating instructions are posted on each hood. (Fig 2.1)

Ames Laboratory Security personnel observe hood status as they perform patrols during the evenings and on weekends. Fume hoods found not being operated in an energy efficient manner are marked with a sticker (Fig 2.2):

Once the hood is marked, the responsible Program Director and Group leader are notified via Daily Discrepancy report, emailed by the Plant Protection personnel each morning and noted again in the Monthly Discrepancy report emailed at the end of each month.



Since starting the hood surveillance program, procedural violations related to hood operation have been reduced by approximately 53%. (Fig 2.3)



### 2.1.1.2 Planned Actions.

#### **Energy Saving Performance Contract**

No ESPC is currently being developed at the Ames Laboratory.

#### **Upgrade Spedding Hall Windows**

Spedding Hall has 136 windows on the ground, first, second, third, and penthouse floors. They are metal frame, single pane, and fixed type. Such window systems are energy inefficient, with low thermal resistance and poor shading characteristics, meaning that they do not effectively inhibit the transfer of heat and direct sunlight. This project considers replacing the existing windows with new double pane "low emissivity" windows, which have almost double the thermal resistance and shading performance, as well as a greatly reduced air infiltration rate around the frame. The new windows will save energy and money expended to heat and to cool the Hall.

#### **Energy Conservation Project - Lighting Upgrades**

Ames Laboratory has approximately 3,300 lighting fixtures that contain older lighting technology, fluorescent or incandescent light sources. These fixtures use magnetic ballasts and T12 fluorescent lamps or screw-in type incandescent lamps. While functional, such lamps are less efficient than current technology lighting systems and consume more electricity than current technology fixtures. In addition, the less efficient fixtures generate a larger cooling load during summer months. Ames Laboratory will retro fit the existing lighting fixtures with current technology lighting sources.

The lighting retro fits will focus on the following strategies to reduce energy consumption and operating and maintenance (O&M) costs, and improve the quality of light:

- Reducing the number of lamps and ballasts and different types of lamps.
- Electronic ballasts and 28-watt fluorescent lamps will be used to reduce existing lighting wattage per square foot.

### **Line Item Construction of Facilities**

In prior year's plans, a line item project to replace the Metals Development Building was a major component of our sustainability and energy conservation plans. The project was planned for funding under the Science Laboratory Initiative (SLI) Program of the Office of Science for the modernization of laboratory facilities. Within the past year, the SLI funding schedules were revised and the funding for this project was shifted from FY 2012 to FY 2017. The project was designed to provide modern research space that would address the mission needs of the Laboratory and to be the cornerstone of plans to meet the DOE goals for energy conservation and site sustainability. The revised funding schedule delays the completion of this project until after the target dates of the energy and sustainability goals.

Because of the delay and the increasing uncertainty of the SLI funding for the project, the Laboratory is reviewing other options for projects that would address the critical mission readiness and site sustainability needs. The Laboratory will be investigating the feasibility of alternative projects that would provide facilities for the most critical mission readiness needs, provide significant site sustainability improvements, leave the Metals Development Building in place and have a significantly lower cost than replacing the Metals Development Building. It is anticipated that the plan would still require line-item funding but at a much lower level. Any new buildings or facilities will be designed and constructed to achieve LEED Gold Certification. References indicate that LEED Gold Certification typically results in energy savings of 50-60% as compared to existing buildings. Adding high performance facilities to our inventory will significantly improve energy efficiency metrics. It will enable the Laboratory to implement technologies and practices that cannot be effectively and efficiently incorporated into our existing building inventory.

### **Retro Fit Building HVAC**

Ames Laboratory is currently in the process of retro fitting the entire HVAC system of a building nearly 60 years old. The project, funded through GPP funds is expected to continue, in phases, through FY 2012. The retro fit will convert the system from a zoned constant-volume reheat system to a variable-volume system with climate control in each lab or office space. In addition to the improved control, the project will eliminate the energy waste from unnecessary use of reheat and will save fan energy.

### **Operations and Maintenance**

#### **Exhaust Stack Repair (Laboratory Fume Hoods)**

In Spedding Hall, the existing laboratory exhaust hood system suffers from leaking exhaust stacks. This leaking stack condition consumes maximum fan energy and limits the effectiveness of the system to remove exhaust stream air contaminants, which consumes more energy than that of a properly operating sealed system. Ames Laboratory proposes to repair the existing laboratory fume hood exhaust stack system to improve the exhaust systems' effectiveness, reduce excess exhausted building air, and reduce required fan horsepower.

#### **Retro Commissioning of Existing Buildings**

A recommissioning of the HVAC system serving the Metals Development Building is planned.

#### **Vacuum Pump Modernization Study**

Review the number, types, age, and power requirements of vacuum pumps utilized at the Ames Laboratory. The results of the study will be used to determine if a general upgrade of Laboratory vacuum pumps would improve energy efficiency and reduce O&M costs associated with maintaining older pumps.

## Fume Hood Monitoring

Ames Laboratory will continue its hood surveillance program with a goal to reduce fume hood operational discrepancies again in FY 2011. See Section 2.1.1.1 for details.

### Energy Efficiency Metrics Table

			2003	2010		
Gross Square Feet			324,501	327,664		
Total Buildings Energy Use (MBtu)			79,827	72,074		
ESPC Project or separate Energy Conservation Measure *	Actual or Estimated Energy Saved MBtu/yr	Percent of Base Energy Use/Square Foot	Actual or Estimated Implementation Cost	Expected Year of Implementation	Funding Source (ESPC, UESC, Overhead, GPP, Other)	For ESPCs, indicate expected date of Delivery Order Award
Energy and Water Conservation Project (lighting and plumbing fixture upgrades)	667	1%	\$490K	2014	GPP	
Spedding Hall HVAC Upgrade	1,718	2%	\$3,515K	2013	GPP	
Retro commissioning	1,300	1%	\$77K	2012	Overhead	
Exhaust Stack Repair	5,660	7%	\$533K	2014	Overhead	
Upgrade Spedding Hall Windows	1,124	1%	\$495K	2014	GPP	

### 2.1.2 Increase Departmental Renewable Energy Consumption

The Department is required to have 7.5 percent of its electricity consumption come from renewable energy sources by FY 2013, per Section 203 of EPACT 2005. The statute provides for a double bonus if the renewable energy is produced on-site (i.e., only 3.75 percent would be needed if all of it were produced on-site) and if the RECS are retained. DOE O 430.2B accelerates and allocates the renewable energy goal to FY 2010 to all DOE sites. Moreover, the Order encourages sites to increase their total annual thermal energy consumption from on-site renewable sources to the maximum extent possible and stipulates that “each site must install a renewable energy project or show that renewable energy is not feasible at the site because of economic or renewable resource barriers.” The renewable energy goals are based on the total energy consumption at all facilities, including those excluded from the energy intensity reduction requirements.

**2.1.2.1 Performance Status.**

1. Self-generated renewable energy: The Ames Laboratory has installed four solar power area lights as a demonstration project for photovoltaic electricity. Each area light is a multi-LED design that operates at night utilizing batteries that are charged during the day by 45 Watt photovoltaic solar panels.

2. Purchased renewable energy: The Ames Laboratory buys electricity from the City of Ames which generates 10% - 12% of its electricity by burning refuse from the City Resource Recovery Plant, a renewable resource. At the Ames Laboratory, this would amount to a minimum of 710 MWh at a cost of \$49,700 during FY 2010. Current guidelines do not allow Ames Laboratory to apply this energy to use reduction goals or renewable energy goals since the City of Ames has been generating 10% - 12% of its electricity from renewable sources since 1975 and includes the energy as part of their standard "mix".

Beginning in January, 2010 the City of Ames began purchasing wind power from a wind farm in Zearing, Iowa and tracking the supplied power. To comply with renewable energy goals, the Ames Laboratory purchased 570 MWh of this power as evidenced through the retirement of 570 Renewable Energy Certificates (RECs) in FY 2010 at a cost of \$1,995. 570 MWh is 8% of the Laboratory's FY 2010 electric energy consumption and exceeds the 7.5% requirement.

If both sources of renewable electrical energy supplied to the Ames Laboratory were accounted for, a total of 18% - 20% of the electricity used by The Ames Laboratory in FY 2010 was renewable.

The contractor provides steam and chilled water to the Laboratory through a distribution system supplied from their power plant on campus. This past fall, the power plant completed testing of wood chips and wood pellets blended with coal. Blends of up to 15% were successfully burned in the boilers. The contractor is determining if it's feasible to begin adding wood pellets or chips to Iowa State's coal-fired boilers. They are working with the Iowa Department of Natural Resources to review the data collected during a series of wood-burning tests at Iowa State. If this proves successful, then a portion of the steam and chilled water used by the Laboratory would be generated from renewable sources.

**2.1.2.2 Planned Actions.**

The Ames Laboratory will continue to meet renewable energy goals through the purchase of renewable energy from our supplying utility or through the purchase of RECs.

**Waiver**

The Ames Laboratory has been granted a waiver for the on-site renewable energy generation requirement.

**Renewable Energy Metrics Table**

Renewable Energy/Thermal Energy Technology including RECs	System Size (capacity)	Total MWh/yr	Renewable Energy Initial Project Capital Cost	Funding Source (ESPC, UESC, PPA, Other)	Expected Year of Implementation
RECs		300		Overhead	FY2009
WIND W/RECs		570		Overhead	FY2010 – FY2012
WIND W/RECs		700		Overhead	FY2013 and Beyond

### **2.1.3 Reduce Departmental Fleet Petroleum Use by 2 Percent Annually and Increase Alternative Fuel by 10 Percent Annually over the Previous Year**

The primary DOE transportation and fleet management goals are to decrease fleet petroleum consumption by 2 percent annually from a FY 2005 baseline and increase alternative fuel consumption by 10 percent annually over the previous year from a FY 2005 baseline (i.e., 159 percent increase from FY 2005 to FY 2015). Additionally, DOE is to annually meet the EPACT 1992 AFV acquisition requirement, whereby 75 percent of light duty vehicles acquired must be AFVs. Sites should strive to meet these goals, but ultimately DOE Under Secretaries will be responsible for developing and meeting DOE's goals.

#### **2.1.3.1 Performance Status.**

The Ames Laboratory is exempt from Transportation/Fleet Management requirements because of the size of our fleet (four GSA vehicles). However the Laboratory will pursue the goals as much as possible within what can be done with such a limited fleet. Gasoline powered vehicles currently use a 10% ethanol blend. As vehicles are replaced, the Laboratory will pursue acquisition of flex fuel, compressed natural gas, biodiesel, or hybrid electric vehicles. Commercial E85 fuel is available locally.

25% of the Ames Laboratory's fleet is AFVs.

Ames Laboratory increased its usage of alternative fuel by 115% from FY 2009 to FY 2010.

#### **2.1.3.2 Planned Actions.**

Ames Laboratory will continue to work with GSA to integrate AFVs, hybrid, and plug-in electric vehicles into its fleet.

### **2.1.4 Metering**

DOE is required by DOE O 430.2B, 1.b.(3) and 4.c.(4) to install metering devices, advanced or standard, to the maximum extent practicable at all sites in each building and other facilities and grounds for electricity, natural gas, steam, and water. This requirement stems from statutes including EPACT 2005 Section 103 for meters for electricity by October 1, 2012 and EISA 2007 Section 434 for natural gas and steam by October 1, 2016. The SSPP accelerates the natural gas and steam metering goal to October 1, 2015. The SSPP also commits sites to complete updates of their metering plans no later than August 2011.

#### **2.1.4.1 Performance Status.**

The Ames Laboratory has completed the required meters by the 2012 target. The metering plan called for the installation of advanced electrical metering in the four buildings that meet the criteria for advanced meters. This includes the three research buildings and the administrative services building. The smaller support and service buildings do not meet the criteria. The installation of the advanced electrical metering began in and was completed in FY 2010.

#### **2.1.4.2 Planned Actions.**

See attached FY 2011 metering plan.

#### **2.1.5 Cool Roofs**

**Per Secretary Steven Chu's memorandum of June 1, 2010, "effective immediately, unless determined uneconomical by a life-cycle cost analysis, roof replacements and roofs for new construction shall be cool roofs (unless the project already has CD-2 approval) [6]. Moreover, to enhance overall building thermal performance, new roofs shall have a thermal resistance of at least R-30."**

##### **2.1.5.1 Performance Status.**

Currently the Ames Laboratory has two roofs, totaling approximately 16,000 square feet that qualify as cool roofs. This is approximately 13% of the Laboratory's total roof area.

##### **2.1.5.2 Planned Actions.**

Unless determined uneconomical by a life-cycle cost analysis, future roof replacements shall be cool roofs. Moreover, new roofs shall have a thermal resistance of at least R-30.

#### **2.1.6 Training**

**DOE O 430.2B requires the following:**

**"Train personnel at each site to direct energy and water management programs and dedicate all or a substantial portion of their time to the effective implementation of energy and water management plans.**

**"Ensure accountability by including the successful implementation of this order in the performance evaluations for the Senior Agency Official and relevant staff such as facility managers, energy managers, vehicle fleet managers, contracting officials and facility managers, and others as appropriate.**

**"Implement employee incentive programs to reward exceptional individual and team performance in increasing energy efficiency and water conservation, deploying renewable energy, minimizing waste, reducing utility costs, and reducing greenhouse gas emissions.**

**"Implement outreach programs to motivate employees to become more efficient in their use of energy, water, and green products and services, and to minimize waste."**

**Additionally, the SSPP commits DOE to the following:**

**"[By September 2012] DOE will require the Energy Manager of every DOE site to attain a Certified Energy Manager qualification. The Energy Manager position on all sites with**

**greater than 5 million [gross] square feet of building shall be a full time position focused on water, energy and GHG management.**

**“Include energy conservation and recycling in employee orientation programs [by November 2010].”**

#### **2.1.6.1 Performance Status.**

New employees are given Environmental Management System training through General Employee Training. Employees are encouraged to look at their activities and conserve energy, reduce waste, and recycle as much as possible. Employees are also encouraged to send their energy savings, pollution prevention, and recycling ideas to [greenidea@ameslab.gov](mailto:greenidea@ameslab.gov) for consideration by the Laboratory’s Environmental Management Steering Committee.

The contractor has many programs and activities that encourage and empower improvements in sustainability. These programs and activities support efforts across the entire campus which includes Ames Laboratory. For details please access the web site, <http://www.livegreen.iastate.edu/>.

Staff participated in the 2009 and 2010 Sustainability Symposium presented by the contractor. The symposium is presented for university staff, faculty, and students in order to learn more about sustainable activities and initiatives at Iowa State University. Presenters include national and international sustainability experts.

#### **2.1.6.2 Planned Actions.**

By September 2012 Ames Laboratory will have an energy manager with a Certified Energy Manager qualification.

Consider additional participation in campus-wide planning and advisory groups that address sustainability issues. Continue and expand participation in the annual Sustainability Symposium.

Update the position descriptions of appropriate individuals to include SSP responsibilities to incorporate them in performance evaluations.

Develop additional training and resources to aid staff in sustainability awareness.

#### **2.1.7 SF<sub>6</sub> Reduction**

**The SSPP commits DOE to “acquire SF<sub>6</sub> capture and storage equipment, develop training, and deploy SF<sub>6</sub> capture program at key DOE sites subject to funding availability [by September 2012].”**

##### **2.1.7.1 Performance Status.**

The Ames Laboratory has a single piece of electrical gear that is insulated utilizing SF<sub>6</sub>. Should the gear need repair that would require removal of the SF<sub>6</sub> insulating gas, the unit would either be shipped back to the manufacturer for removal of the SF<sub>6</sub> and repair or Iowa State University electricians with the training and equipment to remove and reclaim the SF<sub>6</sub> would be tasked with the repair.

### **2.1.7.2 Planned Actions.**

Review future acquisitions to strictly control the amount of SF6 on-site.

### **2.1.7A Behavior Change**

#### **2.1.7A.1 Performance Status.**

Ames Laboratory includes information on proper use of fume hoods during initial General Employee Training to start the process of changing behavior concerning fume hood operation. The behavior change in the training is re-enforced through regular surveillance of hood operating practices and flagging of discrepancies. See section 2.1.1.1

New employees are given Environmental Management System training through General Employee Training. Employees are encouraged to look at their activities and conserve energy, reduce waste, and recycle as much as possible. Employees are also encouraged to send their energy savings, pollution prevention, and recycling ideas to [greenidea@ameslab.gov](mailto:greenidea@ameslab.gov) for consideration by the Laboratory's Environmental Management Steering Committee.

The contractor has many programs and activities that encourage and empower improvements in sustainability. These programs and activities support efforts across the entire campus which includes Ames Laboratory. For details please access the web site, <http://www.livegreen.iastate.edu/>.

Staff participated in the 2009 and 2010 Sustainability Symposium presented by the contractor. The symposium is presented for university staff, faculty, and students in order to learn more about sustainable activities and initiatives at Iowa State University. Presenters include national and international sustainability experts.

#### **2.1.7A.2 Planned Actions**

Ames Laboratory looks to expand energy use information available to employees through modification of internal web pages to display current energy use and demand for individual buildings in an effort to increase awareness of energy use and to encourage energy conservation behaviors.

Continue and expand participation in the annual Sustainability Symposium.

Develop and implement sustainable acquisition guidelines within the credit card training.

Update Ames Laboratory Purchasing website to provide a convenient resource and to educate Ames Laboratory employees on sustainable acquisitions.

### **2.1.8 Overall Reduction of Scope 1 & 2 GHG Emissions**

**While sites are not required specifically to meet the 28 percent target that the agency as a whole is committed to meeting, they are encouraged to strive to meet the Department's target. This section affords sites to describe their current state of GHG emissions and plans to reduce them, given various elements of GHG emissions described in the subsections above.**

### **2.1.8.1 Performance Status.**

The FY2010 GHG emissions for Ames Laboratory were 11% lower than they were in FY 2008. The reduction was primarily due to increased energy efficiency and replacing 570 Mwh of coal-fired electric power with wind power.

### **2.1.8.2 Planned Actions.**

Continue to address energy efficiency, focusing extra efforts on those areas that produce the most GHG. As we reduce site energy usage, the amount of GHG produced will also be decreased. One method of reducing GHG production is by replacing the coal generated electricity currently utilized by the Laboratory with a larger percentage of wind energy which would be accounted for by receiving the retired REC's. Ames Laboratory has the potential of purchasing up to 100% of its electricity from wind generating sources..

## **2.2 Scope 3 Greenhouse Gas Emissions Reductions**

**The SSPP commits DOE to reduce its Scope 3 GHG emissions by 13 percent, and also commits the Department to “develop incentive programs to encourage car sharing for employees attending out of town meetings [by March 2011].” While sites are not required specifically to meet the 13 percent target that the Department as a whole is committed to meeting, they are encouraged to strive to meet the target.**

### **2.2.1 Performance Status.**

Green House Gases (GHG) computed for FY 2008 were 4,747.5 mte CO<sub>2</sub>

The 2010 inventory of Scope 3 GHG attributable to activities at the Ames Laboratory show an increase in output to 5,393 mte CO<sub>2</sub> or an increase of 13.6% over FY 2008.

### **2.2.2 Planned Actions.**

Ames Laboratory is working on developing a plan to begin reducing the Scope 3 GHG production of GHGs attributable to activities at the Ames Laboratory. One course of action being considered is to increase the percentage of wind generated electrical power utilized by the Laboratory which will reduce the transmission and distribution scope 3 GHS produced. In addition the Laboratory is developing programs to encourage more carpooling and use of public transportation to reduce the GHGs produced during employee commuting.

## **2.3 Comprehensive Greenhouse Gas Inventory**

**Based on the sections above, summarize the site's GHG emissions profile and identify priority areas for reductions. Sites may utilize the preliminary FY 2008 site GHG inventory provided by FEMP. The inventory will not cover certain minor emissions, but will suffice to develop an initial estimate. FEMP will use organizational and operational boundaries for accounting each site's**

GHG emissions, as well as the emission factors and methodologies used to calculate emissions that are consistent with the draft *Federal GHG Accounting and Reporting Recommendations*. [7] Sites do not have to use FEMP’s inventory but should use the accounting methods detailed in the draft federal guidance if they choose to develop an inventory themselves. Site-generated inventories should be submitted along with their SSPs. As DOE and federal government GHG emission reporting systems mature, a single GHG database is envisioned within DOE for future years.

### 2.3.1 Performance Status.

#### 2010 Ames Laboratory GHG Inventory

Emissions Scope	Fuel	Consumption	Original Unit	Consumption in Base Unit	Base Unit	mt CO2
Scope 2	Electricity-MWH	6,532.400	mwh	6,532.400	mwh	5,427.397
Scope 1	Natural Gas-(MCF)	1,579.250	thousand cubic feet	1,579.250	thousand cubic feet	86.567
Scope 2	Other-(Btu X 10 9)	20.342	bbtu	20.342	bbtu	985.153
Scope 2	Steam-(Btu X 10 9)	25.804	bbtu	25,804.000	MMBtu	2,240.948
Scope 1	Auto Gas-(K Gal)	0.000	kgal	0.000	gallon	0.000
Scope 1	Diesel-(K Gal)	0.483	kgal	483.200	gallon	4.906
Scope 1	DSL	232.000	gallons	232.000	gallons	2.354
Scope 1	GAS	682.000	gallons	682.000	gallons	6.045
Scope 3	T&D Losses MWh					275.260
Scope 3	Business air travel					4,865.100
Scope 3	Business ground travel					42.700
Scope 3	Waste water					3.395
Scope 3	Employee commute					206.600
						<b>14,146.426</b>

### 2.3.2 Planned Actions.

Ames Laboratory’s largest source of GHG emissions are from use of electrical power, steam and business air travel.

The steam and electric usage are being addressed through energy conservation and use of more wind power. Plans and policies are being developed to address Scope 3 GHGs as many of the reduction strategies will affect sub-sets of employees at a more personal level than site wide energy conservation measures tend to.

## 2.4 High-Performance Sustainable Design

### 2.4.1 HPSB New Construction

Section 4.d of DOE O 430.2B stipulates that all new buildings and major renovations at CD-1 or lower (in other words not yet having obtained CD-2 approval), with a value exceeding \$5 million, must achieve the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED®) Gold certification and, to the extent possible and life-cycle cost effective, meet the Guiding Principles for Federal Leadership in High-Performance and Sustainable Buildings

(hereafter, “Guiding Principles”). Any buildings below or equal to the \$5 million threshold are still required to meet the Guiding Principles. In addition, per Section 109 of EPACT 2005, all new federal buildings in the design stage (i.e., CD-1 or lower) as of October 1, 2006 shall be designed such that their energy consumption is 30 percent below the ASHRAE standard.

Note that federal rules are being developed to address Sections 433 and 523 of EISA that will require new construction buildings and major renovations to use significantly less fossil fuel-based energy consumption and meet at least 30 percent of the hot water demand by solar hot water heaters, if life-cycle cost-effective. As details are developed, sites will be requested to provide information on building fossil fuel use in the future. No action is expected for this fiscal year.

#### **2.4.1.1 Performance Status.**

There are no new construction projects or major renovations that are currently in process.

Laboratory staff received on-site training in the Guiding Principles for High Performance and Sustainable Buildings.

#### **2.4.1.2 Planned Actions.**

The Laboratory recognizes the requirement for new construction to achieve certification to the LEED Gold Standard and for the application of the guiding principles in major renovation projects. The Laboratory will incorporate those requirements in the design and construction of any new facilities.

#### **2.4.2 HPSB Existing Buildings**

Section 4.d(1) of DOE O 430.2B states that “all programs that own or lease real property must develop and implement a plan, as part of the executable plan, to ensure that at least 15 percent of their enduring buildings are compliant with the Guiding Principles of Executive Order 13423.” The Order further states that Executable Plans (now SSPs) shall “establish a time line for execution coupled with specific performance measures and deliverables designed to achieve [the Order’s goals].” Executive Order 13423 was later codified into law in Section 748 of the Omnibus Appropriations Act of 2009. EO 13514 and the SSPP further clarify the goal to be 15 percent of the *number of buildings*, not square footage, although both will be tracked. Buildings that fall under this requirement are limited to those greater than 5,000 square feet. Additionally, EO 13514 and the SSPP require 15 percent by FY 2015 while stipulating continued progress towards 100 percent.

#### **2.4.2.1 Performance Status.**

Laboratory staff members have been trained in the Guiding Principles for High Performance and Sustainable Buildings.

#### **2.4.2.2 Planned Actions.**

In FY 2011 Ames Laboratory will begin evaluation of existing buildings for compliance with the guiding principles of E.O. 13423. By 2015, 15% of the Ames Laboratory building inventory will meet the guiding principles as required by E.O. 13423. The following elements will contribute to the process:

- Develop plan to assess current building inventory.

- Perform any staff training needed to perform evaluations.
- Establish the list of existing enduring buildings that require evaluation.
- Perform initial screening using the DOE assessment tool to establish how the site compares to the 15% goal.
- Use the results of the initial screening to perform a gap analysis. Use the gap analysis to establish the most cost-effective way to reach the 15% goal by FY2015.
- Budget and implement the tasks required to meet the 15% goal.
- Develop a plan for exceeding the goal and implementing the guiding principles in all buildings where it is economically justified.

The status and progress toward these goals will be tracked. Data on sustainability status of each building asset has been entered in FIMS. This data will be updated as evaluations are completed and the status changes.

## **2.5 Regional and Local Planning**

**The EO 13514 instructs federal agencies including DOE to meet the following regional and local planning goals.**

- **Participating in regional transportation planning and recognizing existing community transportation infrastructure;**
- **Aligning federal policies to increase the effectiveness of local planning for energy choices such as locally generated renewable energy;**
- **Ensuring that planning for new federal facilities or new leases includes consideration of sites that are pedestrian friendly, near existing employment centers, and accessible to public transit, and emphasize existing central cities and, in rural communities, existing or planned town centers;**
- **Identifying and analyzing impacts from energy usage and alternative energy sources in all Environmental Impact Statements and Environmental Assessments for proposals for new or expanded federal facilities under the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.); and**
- **Coordinating with regional programs for federal, state, tribal, and local ecosystem, watershed, and environmental management.**

**The SSPP commits DOE to the following actions:**

- **Ensure participation in regional transportation planning is incorporated into site policy and guidance documents (by September 2011)**
- **Identify regional transportation planning, ecosystem, watershed, and environmental management initiatives affecting sites and opportunities to work with local authorities to align energy policies and siting of renewable energy infrastructure (by February 2011)**
- **Assess state of interaction between sites and their local/regional organizations (by September 2011)**

### **2.5.1 Performance Status.**

Ames Laboratory facilities personnel have regular interaction with City of Ames Electric Department personnel regarding utility supply issues including locally-generated renewable power, REC's, pricing, incentive programs, and other topics.

The contractor has significant interaction with state and local officials regarding transportation issues. The contractor participates in the Ames Area Metropolitan Planning Organization. This organization includes state, county, and city officials.

The contractor supports Cy-Ride, the local city bus system. It is a collaboration between the city of Ames, Iowa State University, and ISU's Government of the Student Body. The contractor has representation on the Cy-Ride transit board.

Contractor leadership has been instrumental in attracting funding for a regional transit intermodal facility. The grant application was a collaboration between the contractor, the City of Ames, and Cy-Ride.

The Laboratory is represented on various planning and advisory groups with the contractor and local officials. The Manager of the Facilities Services Group represents the Laboratory on the Traffic Advisory Council which provides input to contractor management on traffic issues. Another example is participating in a planning group working to improve traffic flow near the Laboratory and safety, especially for pedestrians and bicyclists.

## **2.5.2 Planned Actions.**

Assess opportunities for additional participation and input into local and regional planning through the structures of the contractor.

## **2.6 Water Use Efficiency and Management**

### **2.6.1 Water Efficiency**

**DOE O 430.2B stipulates that DOE will reduce water intensity by no less than 16 percent by FY 2015, relative to a FY 2007 baseline (DOE O 430.2B, 1.b.(2)). DOE is expected to update the Order to reflect EO 13514, which requires a 26 percent reduction in potable water intensity by FY 2020 and a 20 percent consumption reduction in ILA water by FY 2020 from an FY 2010 baseline. ILA is defined as follows in draft federal guidance that is in concurrence (see Attachment 3):**

**“Industrial water consumption – is defined as water used for the purposes of aiding in processes such as cooling, washing, and manufacturing. Industrial water often is supplied on-site, withdrawn from local freshwater sources, but industrial water can also be purchased from public-supplied sources. Some examples of industrial water consumptions may include vehicle wash facilities, make-up water for cooling towers, and process steam production. Water reused in industrial processes is not considered to be industrial water consumption...**

**“Landscaping water consumption – is defined as the controlled application of water to outdoor spaces that have been designed to achieve socio-behavioral, environmental, and/or aesthetic outcomes to supplement water requirements not satisfied by rainfall. Examples of landscaping water consumption include (but are not limited to) irrigation of turf or landscaped beds and ornamental ponds and fountains. Water reused in landscaping is not considered to be landscaping water consumption.**

**“Agricultural water consumption – is defined as water used for irrigation and other uses related to the production of agricultural products including food and goods production through farming and forestry and water use related to animal and livestock operations and agricultural research and development. Some examples of agricultural water use include (but are not limited to) using aquifer water that is not treated for human consumption for crop irrigation, fish hatcheries, and dairy operations...”**

**The SSPP and EISA Section 432 require that sites conduct water evaluations and identify measures to save water. The SSPP specifically commits DOE to developing site water management plans and conducting water audits with a particular focus on leaks and once-through cooling. Water management plans (or their updates if they are out-of-date) should be completed by September 2011 and submitted with the FY 2011 SSPs.**

### **2.6.1.1 Performance Status.**

The Ames Laboratory has meter data for all domestic water usage for the base year of FY 2007. Total consumption in the base year is 4,792 kgal or 14.6 gal./sq.ft. Water consumption for FY 2010 was 5,446 kgal or 16.6 gal./sq.ft. An increase of 13.8% compared to the base year water use intensity. There is no water used for irrigation or landscaping at the site.

Ames Laboratory has replaced 220 standard sink aerators with “Water Sense” flow restricting sink aerators.

### **2.6.1.2 Planned Actions.**

#### **Energy Conservation Projects - Water and Sewer Conservation Component**

This component of the Energy Conservation Projects applies to domestic water fixtures located in buildings at Ames Laboratory. The current plumbing fixtures result in wasted water by using more flow than is required. For fixtures that deliver hot water, the excess flow also wastes the energy required to heat the water, although no water heating savings were claimed for this project. New, low-flow fixtures have improved to the point where they are very reliable. Only plumbing fixtures that are currently inefficient high water users will be retro fitted. All others will remain as they are now. The project will include:

- a. Replacing water closets and flush valves.
- b. Retro fit of urinal flush valves.

<b>Fixture</b>	<b>Upgrade Quantity</b>
New Toilets	54
Urinal Flush Valve Retro fits	16

#### **Line Item Construction of Facilities**

In prior year’s plans, a line-item project to replace the Metals Development Building was a major component of our sustainability and energy conservation plans. The project was planned for funding under the SLI Modernization Initiative of the Office of Science. Within the past year, the SLI funding schedules were revised and the funding for this project was shifted from FY 2012 to FY 2017. The

project was designed to provide modern research space that would address the mission needs of the Laboratory and to be the cornerstone of plans to meet the DOE goals for energy conservation and site sustainability. The revised funding schedule delays the completion of this project until after the target dates of the energy and sustainability goals.

Because of the delay and the increasing uncertainty of the SLI funding for the project, the Laboratory is reviewing other options for projects that would address the critical mission readiness and site sustainability needs. The Laboratory will be investigating the feasibility of alternative projects that would provide facilities for the most critical mission readiness needs, provide significant site sustainability improvements, leave the Metals Development Building in place and have a significantly lower cost than replacing the Metals Development Building. It is anticipated that the plan would still require line-item funding but at a much lower level. Any new buildings or facilities will be designed and constructed to achieve LEED Gold Certification. References indicate that LEED Gold Certification typically results in energy and water savings of 50-60% as compared to existing buildings. Adding high performance facilities to our inventory will significantly improve energy efficiency metrics. It will enable the Laboratory to implement technologies and practices that cannot be effectively and efficiently incorporated into our existing building inventory.

### **Meters**

Ames Laboratory currently has a full array of water meters. Essentially all of the buildings are metered separately. The current meters are read manually. As protocols are developed for the advanced metering called for in DOE Order O430.2b, Ames Laboratory will evaluate the need to replace meters and revise the site-metering plan accordingly.

## **2.6.2 Storm Water Management**

**EISA Section 438 stipulates that, “The sponsor of any development or redevelopment project involving a Federal facility with a footprint that exceeds 5,000 square feet shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow.” EO 13514 required EPA to create guidance to implement this section, which can be found on EPA’s website [13]. The definition of development and redevelopment, for the purposes of Section 438, is found in the EPA guidance and excerpted below.**

***“Development or redevelopment. For the purposes of this provision this term applies to any action that results in the alteration of the landscape during construction of buildings or other infrastructure such as parking lots, roads, etc, (e.g., grading, removal of vegetation, soil compaction, etc.) such that the changes affect runoff volumes, rates, temperature, and duration of flow. Examples of projects that would fall under “redevelopment” include structures or other infrastructure that are being reconstructed or replaced and the landscape is altered. Typical patching or resurfacing of parking lots or other travel areas would not fall under this requirement.”***

### **2.6.2.1 Performance Status.**

The Ames Laboratory does not have any development or redevelopment planned. However, Ames Laboratory understands the importance of maintaining the hydrology of an area and will ensure that the

requirements of the Energy Independence and Security Act (EISA) 438 are incorporated into the specifications of any development or redevelopment undertaken by the Laboratory in the future.

### **2.6.2.2 Planned Actions.**

The Laboratory will work closely with Iowa State University, landowner, and the City of Ames, holder of an MS4 permit, on any development or redevelopment projects.

## **2.7 Pollution Prevention (P2)**

**The SSPP commits DOE to the following P2 goals:**

- **Minimizing the generation of waste and pollutants through source reduction;**
- **Diverting at least 50 percent of non-hazardous solid waste, excluding construction and demolition debris, by the end of FY 2015;**
- **Diverting at least 50 percent of construction and demolition materials and debris by the end of FY 2015;**
- **Reducing printing paper use and acquiring uncoated printing and writing paper containing at least 30 percent postconsumer fiber;**
- **Reducing and minimizing the quantity of toxic and hazardous chemicals and materials acquired, used, or disposed of;**
- **Increasing diversion of compostable and organic material from the waste stream;**
- **Implementing integrated pest management and other appropriate landscape management practices;**
- **Increasing agency use of acceptable alternative chemicals and processes in keeping with the agency's procurement policies;**
- **Decreasing agency use of chemicals where such decrease will assist the agency in achieving GHG reduction targets under Section 2(a) & (b) of EO13514; and**
- **Reporting in accordance with the requirements of Sections 301 through 313 of the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001 et seq.).**

Many of these goals are stipulated in EO 13423 and then codified in section 748 of the 2009 Omnibus Appropriations Act. They are also supported by the Resource Conservation and Recovery Act, which requires minimizing hazardous waste generation, and the Pollution Prevention Act, which requires federal agencies to deploy pollution prevention as the first choice in environmental management.

The SSPP also commits sites to “verify the effectiveness and reliability of their clearance-of-property procedures to identify those materials that cannot be cleared for unrestricted reuse or recycling [initiated September 2011 to be complete by September 2012]” and to “develop a plan for retiring Departmental printers incapable of duplex printing [by December 2010]...”

### **2.7.1 Performance Status.**

Ames Laboratory continues to reduce its hazardous waste as much as feasibly possible while maintaining laboratory research activities. Employees are encouraged to look at their research activities and to purchase smaller, greener alternatives, if possible, as well as sharing and/or redistributing unwanted chemicals for reuse.

The Laboratory has a robust recycling program that keeps the Laboratory's solid waste generation low. Note that the Laboratory's solid waste is incinerated at the City of Ames energy recovery plant to produce electricity.

The Laboratory purchases 30% postconsumer-recycled paper products whenever feasible.

Employees are encouraged to use less toxic (environmentally-preferred chemicals) materials whenever possible. The Laboratory's Environment Safety Health & Assurance (ESH&A) department monitors chemical purchases.

The Laboratory does not have a cafeteria onsite and it would not be feasible to collect compostable materials.

Pesticide management services are contracted services.

The Laboratory's ESH&A department reviews all chemical purchases and will make alternative recommendations as necessary. Employees are also trained and encouraged to utilize alternative chemicals and products that are more environmentally friendly.

The Laboratory's ESH&A department reviews chemical and equipment purchases. GHG-producing chemicals and equipment will be reviewed for alternatives.

The Laboratory, as applicable, reports on the Resource Conservation Recovery Act (RCRA) sections 301 through 313 in the Annual Site Environmental Report and to all appropriate federal and state agencies as necessary.

The Laboratory reports the above information to DOE through the Pollution, Prevention, Tracking, & Reporting System (PPTRS) and the Annual Site Environmental Report.

## **2.7.2 Planned Actions.**

Ames Laboratory continually tries to find ways to reduce its environmental footprint. The Laboratory's Environmental Management System Steering Committee (EMSSC) will meet quarterly to consider new practices, activities and programs that will reduce the Laboratory's environmental footprint. The committee will make recommendations to the Executive Council that will help meet DOE goals.

The Laboratory's ESH&A department will continue to review all chemical and equipment purchases and will recommend the use of alternative chemicals and products that are more environmentally friendly where feasible.

## **2.8 Sustainable Acquisition**

**The SSPP commits DOE to the following sustainable acquisition goals:**

- **Ensure that 95 percent of new contract actions, including task and delivery orders under new contracts and existing contracts, require the supply or use of products and services that are energy efficient (ENERGY STAR<sup>®</sup> or FEMP-designated), water efficient, bio-based,**

environmentally preferable (including EPEAT-registered products), non-ozone depleting, contain recycled content, or are non-toxic or less toxic alternatives; and

- Update Departmental affirmative procurement plans (also known as green purchasing plans or environmentally preferable purchasing plans), policies, and programs to ensure that all federally-mandated designated products and services are included in all relevant acquisitions).

The underlying purchasing requirements are also supported by a number of federal statutes. These include Section 104 of Energy Policy Act of 2005, which requires Federal agencies to incorporate energy efficiency criteria consistent with ENERGY STAR and FEMP-designated products for all procurements involving energy-consuming products and services, Section 6002 of the Resource Conservation and Recovery Act, which requires federal agencies to purchase EPA-designated recycled content products, Section 9002 of the Farm Security and Rural Investment Act of 2002, which requires the purchase of USDA-designated biobased products, and Section 748 of the 2009 Omnibus Appropriations Act, which covers all underlying product categories listed though its codification of EO 13423.

### **2.8.1 Performance Status.**

The Laboratory is currently tracking EPEAT-registered products and EPA designated products. Data is annually entered into DOE's PPTRS a web based data collection system. Reports are available on the PPTRS website (<http://www.hss.doe.gov/pp/dataentry.html>).

The ESH&A Environmentally-Preferred Purchasing (EPP) coordinator reviews acquisitions for EPA-designated items.

### **2.8.2 Planned Actions.**

Develop and implement sustainable acquisition guidelines within the credit card training.

Decide what commodities to track, and then implement a tracking mechanism to measure contract compliance.

Update Ames Laboratory Purchasing website to provide a convenient resource and to educate Ames Laboratory employees on sustainable acquisitions.

## **2.9 Electronic Stewardship and Data Centers**

The SSPP and DOE O 430.2B commit DOE to the following:

- Establish and implement policy and guidance to ensure use of power management, duplex printing, and other energy efficient or environmentally preferred options and features on all eligible Departmental electronic products;
- Update Departmental policy to reflect environmentally-sound practices for disposition of all excess or surplus electronic products;
- Update Departmental policy to ensure implementation of best management practices for energy efficient management of servers and federal data centers;
- Identify how DOE intends to meet technology energy consumption reduction goals in its data centers;

- Increase the quantity of electronic assets disposed of through sound disposition practices; and
- Phase-in installation of dedicated meters for data centers.

The SSPP specifically commits DOE to the following:

“All DOE sites will address each of the following methods to reduce the use of office paper: (i) setting printers and copiers to duplex print and copy by default, (ii) image reduction, through copying and printing of multiple pages on a single page, (iii) using thinner paper where higher quality paper is not essential, (iv) implementing innovative approaches to paper use reduction through print management technology and electronic document management, display and storage technologies, (v) encouraging digital storage of records and files wherever the law allows, and (vi) assessing policies and procedures that require excessive document printing when electronic filing and transmittal are allowable.”

Data centers are defined in last year’s survey as: “Any facility that primarily contains electronic equipment used to process, store, and/or transmit digital information (including scientific, enterprise, internet, telecommunication, and other applications), which may be — (A) a free-standing structure; or (B) a facility within a larger structure that uses environmental control equipment to maintain the proper conditions for the operation of electronic equipment.” DOE O 430.2B requires that sites, “Reduce the energy consumption of data center and server operations by specifying the acquisition of energy efficient electronic equipment for data centers, operating the equipment to improve load management and server innovation, and configuring the cooling operations to maximize energy efficiency opportunities.”

### 2.9.1 Performance Status.

New computers are set to energy savings settings by the Laboratory’s Information Systems (IS) department. Energy savings settings are outlined in IS-baseline setup procedures.

The Laboratory’s policy is to recycle all computers, monitors, and other miscellaneous electronic equipment. Electronic recycling is tracked internally and in DOE’s PPTRS.

### 2.9.2 Planned Actions.

Ames Laboratory is actively pursuing CPU load-management procedures and techniques for the existing data center as well as cooling configurations to maximize energy-efficiency opportunities.

In any future data centers, the Laboratory will take advantage of new and emerging energy saving technologies and techniques to maximize data center efficiency.

A study will be conducted on the functionality, suitability, and energy use of alternative electronic products. The results of this study will provide input into decisions on acceptable product for purchase.

### 2.10 Site Innovation

Describe innovative ways in which DOE’s research and development (R&D) technologies are being deployed at the site level to support the above sustainability goals.

### **2.10.1 Performance Status.**

Environmental management steering committee provides a mechanism for the R&D groups to interface and exchange information, ideas, and observations concerning sustainability, energy conservation, pollution control, etc. with the Operations groups tasked with oversight of the Laboratory physical assets.

Additionally, the relatively small size of the Laboratory and the relationship with Iowa State University contribute to extensive networking within the Laboratory and extending into the University community of scientists and researchers. This extended network increases the number of influencing disciplines and adds significant diversity to the range of ideas and observations that can be drawn upon to support the site-sustainability goals.

### **2.10.2 Planned Actions.**

Continue to encourage the dialog between the various scientists, researchers, and operations staff. Evaluate those ideas and innovations that present themselves and implement those that support the site-sustainability effort where economically feasible and appropriate.

Consider implementing technology demonstration projects whether for “proof-of-concept” or for education/awareness.

## **3. Return on Investment Evaluation**

**The SSPP commits the Department to establish a process to prioritize projects that most cost-effectively meet sustainability goals, while generating the greatest cost savings for DOE as it executes its mission. As of the release of this guidance, the Department is continuing to work with its stakeholders to finalize this process. Section 1(V) of the Department’s SSPP provides a description of the key factors that will likely play an important role in this process, using the broad framework provided in EO 13514 that agencies “take into consideration environmental measures as well as economic and social benefits and costs in evaluating projects and activities based on life-cycle return on investment.”**

### **3.1 Performance Status**

Based on return on investment criteria, the Ames Laboratory will be pursuing four energy conservation projects and one combined energy and water conservation project over the next several years.

### **3.2 Planned Actions**

Until DOE finalizes a departmental process for prioritizing projects, the Ames Laboratory will continue to utilize traditional cost-effectiveness measures for evaluating the merits of a project. Ames Laboratory recognizes the necessity to “take into consideration environmental measures as well as economic and social benefits and costs in evaluating projects and activities based on life-cycle return on investment.”

## **4. Sustainability Transformation Team**

**DOE will leverage its scientific expertise by directing the DOE National Laboratories and sites to collectively collaborate using the full suite of resources at their disposal (including the expertise of**

laboratory scientists and engineers) to develop innovative, crosscutting strategies for meeting the Executive Order goals. The Sustainability Transformation Teams will aggressively address DOE operations, including high-energy mission specific equipment and facilities, to identify opportunities to improve sustainability and achieve mission requirements. The strategies recommended by the Transformation Teams will be reported to the cognizant Under Secretaries for use by all DOE sites. These strategies will be integrated with and align with the Site's ongoing sustainability planning efforts.

#### **4.1 Performance Status**

Ames Laboratory actively collaborates with other DOE laboratories and government agencies through participation in GovEnergy, Mission Readiness Peer Reviews, FIMS workshops, Energy Efficiency Working Groups, and other such activities.

#### **4.2 Planned Actions**

Ames Laboratory will continue to be actively involved in collaborative activities and will integrate appropriate strategies into the Laboratory's ongoing sustainability planning efforts.

### **5. Management and Funding**

#### **5.1 Management**

Ames Laboratory does not have a dedicated Energy Management Group instead; the primary energy management functions are the responsibility of the Facilities Services Group, which is charged with maintaining the entire facility. The Facilities Services Group is responsible for the development, implementation, and coordination of the Energy Management Plan, and for leading the effort to meet DOE's energy reduction goals.

Additional guidance on energy conservation originates with the Environmental Management System (EMS). The EMS Steering Group is comprised of the members of the Safety Review Committee (SRC), one person from Purchasing & Property Services, and the Environmental Specialist. The Steering Group is responsible for: 1) Forming a registry (list) of Environmental Aspects for the Laboratory. 2) Ranking the impact of each aspect. 3) Recommending objectives and targets to upper management.

## 5.2 Sustainability Funding in Overhead

Summary of Overhead Funded Projects in CEDR Tab 5 (\$000)				
Category:	FY 10 Actual	FY 11 Plan	FY 12 Projected	FY 13 Projected
Water	\$2.2			
Energy Efficiency (non-data centers)	\$16.3	\$81.7	\$165	\$160
Energy Efficiency (data centers)				
HPSB*				
Metering				
Cool Roofs				
Behavior Change				
Lighting	\$6.0			
All other				
Total				

\*HPSB – only include in this category projects that are specific to meeting the guiding principles and contain a mix of tasks such as lighting, meters, roofing, HVAC, etc.

## 5.3 ESPC/UESC On-going & Planned

The Ames Laboratory does not currently have an ESPC or UESC on-going or planned.

## 6. Adding Supply and Purchasing Renewable Energy Certificates (RECs)

### 6.1 On-Site Power Production.

The Ames Laboratory does not have on-site generating capacity nor the sufficient space to install any.

### 6.2 Purchasing Off-Site dedicated renewable or carbon-free electrical energy

The Ames Laboratory is purchasing off-site wind power through the Midwest grid at a premium to obtain the associated RECs to ensure the renewable, carbon free energy purchased by the Laboratory is dedicated to the Laboratory alone.

### 6.3 Purchasing RECs

	Actual FY10	Planned FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20
RECs Purchase Plan (MWHs)*	570	599	628	660	693	727	764	802	842	884	928
Actual/Planned/ Estimated Cost	\$1,995	\$2,100	\$2,315	\$2,547	\$2,796	\$3,063	\$3,350	\$3,658	\$3,989	\$4,344	\$4,724
Unit Costs (\$/MWHs)	\$3.50	\$3.50	\$3.68	\$3.86	\$4.04	\$4.21	\$4.39	\$4.56	\$4.74	\$4.91	\$5.09

\*the purchase plan should be based on the strategic plan for meeting GHG reduction goal in Section 2.1.8  
It is assumed that beginning in FY2012 REC prices will rise by 5% per year.