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Site Sustainability Plan

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Pacific Northwest
NATIONAL LABORATORY

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Acronyms

AEM	advanced electrical meters	GHG	greenhouse gas
AGM	advanced gas meters	GSF	gross square foot
AFV	alternative fuel vehicle	GP	guiding principles
ASIST	Asset Screening Information and Stewardship Tracking Tool	HPSB	High-Performance and Sustainable Buildings
BPA	Bonneville Power Administration	ILA	industrial/landscaping/agriculture
BOCC	building operation command center	IPM	integrated pest management
B2B	Business-to-Business	LEED	Leadership in Energy and Environmental Design
CEM	certified energy managers	LDV	light duty vehicle
CEDR	consolidation energy data report	PNNL	Pacific Northwest National Laboratory
C&D	construction and demolition	PV	photo-voltaic
DSOM	decision support for operations and maintenance	REC	renewable energy certificate
DOE	U.S. Department of Energy	SWM	standard water meters
EMS	Environmental Management System	SSPP	Strategic Sustainability Performance Plan
EMSL	Environmental Molecular Sciences Laboratory	STT	Sustainability Transformation Team
EPP	environmentally preferable purchasing	TRIM	Total Record Information Management
F&O	facilities and operations	T&D	transmission and distribution
FEMP	Federal Energy Management Program	UESC	utility energy services contract
GWP	global warming potentials		

Site Sustainability Plan

1. Executive Summary

The Pacific Northwest National Laboratory (PNNL), located in Richland, Washington, is one of the U.S. Department of Energy's (DOE) ten national laboratories managed by the Office of Science. PNNL performs research for DOE and other government agencies, universities, and industry to deliver breakthrough science and technology to address critical national challenges related to energy, the environment, and national security.

PNNL's main campus is situated next to the Columbia River, a source of natural beauty, water, and hydroelectric power for the Pacific Northwest region. This connection to our natural environment inspires us to carry out our scientific mission in a way that balances the social, environmental, and economic interests of our stakeholders. PNNL, with its comprehensive approach to fulfilling Executive Order 13514, will advance the DOE sustainability mission with a diverse approach and a concentrated effort towards the goals of FY 2020 and beyond.

PNNL's plan includes practical actions that can be taken to save energy and money, improve the comfort and productivity of employees and benefit the environment. We have established a comprehensive greenhouse gas (GHG) emissions inventory, covering FY 2008-10. This has highlighted a few areas of priority for us to take action on in order to meet the DOE goals.

In FY 2010, PNNL signed a two-year renewable energy certificates (REC) purchase as a continuation of a long-standing program. Our purchase provides a significant contribution toward the GHG reduction goal, but it is a near-term strategy. This approach offers time to develop and identify resources to thoughtfully implement a comprehensive plan, for energy conservation. As this strategy is implemented, PNNL's efficiency will increase, and REC purchases will be scaled accordingly to meet the goals.

In early FY 2011, a 125 kW photo-voltaic (PV) array, including car charging stations, will go on line providing electricity into our super computer facility and to adjacent car charging stations.

PNNL has taken an aggressive approach toward the installation of advanced metering. Through FY 2010, 81% of our facilities have advanced metering. In addition, we will implement an operational model that will create a building operation command center (BOCC). The BOCC will utilize the advanced metering data, building control system graphics, and Laboratory developed diagnostic software to optimize building operations.

In the area of high performance sustainable buildings, we have matched and exceeded DOE's goal of 15% of existing buildings, meeting the five *Guiding Principles*. PNNL is currently at 22%, with additional plans being developed to achieve as close to 100% as possible.

Leveraging our existing Environmental Management System (EMS) Core Team, PNNL will form a Sustainability Transformation Team (STT) in FY 2011. The team will include research subject matter experts, facilities and operations staff, human resources, procurement, strategic planning, and other groups. PNNL scientists, with assistance from operations staff, produced a climate neutral campus plan that will be a roadmap for the EMS Core team and STT to use as a guide to meet the 2020 DOE goals.

Table 1. DOE Goal Summary Table

DOE Goal/Mandate	Performance Status	Planned Actions and Key Issues
30% energy intensity reduction by FY 2015 from a FY 2003 baseline	Increased from 160,898 Btu/gsf in FY 09 to 180,300 Btu/gsf at the end of FY 10. Cumulative percent reduction at the end of- FY 10: 8.9% FY 03 Baseline: 197,970 Btu/gsf. FY 15 Goal: 138,579 Btu/gsf.	Implement projects and operation improvement to obtain 30% energy savings by 2015.
28% Scope 1 & 2 GHG reduction by FY 2020 from a FY 2008 baseline	Cumulative percent reduction at the end of- FY 10: 77.5% FY 08 Baseline: 35,882 mtCO2e FY 20 Goal: 25,835 mtCO2e	Plan is to continue to buy renewable energy certificates (RECs) in FY 2011. We will seek funding for major energy retrofit projects.
7.5% of a site's annual electricity consumption from renewable sources by FY 2010 (2x credit if the energy is produced on-site)	0% from on-site generation in FY 10 69.9% from REC purchases in FY 10. Total-69.9%	PNNL will continue to purchase RECs.
Every site to have at least one on-site renewable energy generating system by FY 2010	Does your site have at least one on site renewable generating system? Yes	Complete on-site renewable project (PV array).
10% annual increase in fleet alternative fuel consumption by FY 2015 relative to a FY 2005 baseline	FY06 baseline was 633 gallons (note, FY05 usage was not measured; FY06 is used as the baseline) Cumulative % increase through FY10 = 94%. FY10 increase from FY09- 3.5%	We will add additional AFVs as they become available.
2% annual reduction in fleet petroleum consumption by FY 2015 relative to a FY 2005 baseline	FY05 baseline- 37,926 gallons Cumulative% reduction through FY10 – 7% 0% Reduction FY 09 to FY 10 (note an increase usage of 9% was observed.)	Increase awareness and accountability for our vehicle custodians.
75% of light duty vehicle (LDV) purchases must consist of alternative fuel vehicles (AFV) by FY 2015	Of the total 74 LDV in our fleet at PNNL, 41 or 55% are AFVs. This year, three E85 AFVs and one Hybrid Pick-up truck (still counts as an AFV) LDVs were added to the fleet.	The yearly vehicle replacement orders will include E85 vehicles, as available.
To the maximum extent practicable: advanced metering for electricity (by October 2012), steam, and natural gas (by October 2016); standard meters for water	Number of advanced electrical meters (AEM) installed in FY 10 -7 Total number of AEM currently installed - 19 Total number of AEM planned - 22 Number of advanced gas meters (AGM) installed in FY 10 -14 Number of AGM currently installed -14 Total number of AGM currently planned -14 Number of standard water meters (SWM) installed in FY 10 -12 Number of SWM currently installed - 29 Total number of SWM currently planned - 29	Execute advanced metering plan.

DOE Goal/Mandate	Performance Status	Planned Actions and Key Issues
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.	Total Sf of cool roofs installed in FY 10 - 134,691 Total Sf of cool roofs installed to-date (per FIMS) - 523,842	Engineering standards will be updated to require cool roofs.
Training and outreach. DOE facility energy managers to be Certified Energy Managers by September 2012.	Yes, PNNL is using trained staff to oversee its energy and water management programs.	Continue to provide training opportunities.
Sulfur hexafluoride (SF ₆) capture program by September 2012.	SF ₆ capture program in place - No	Pollution Prevention Assessments planned in FY 2011.
13% Scope 3 GHG reduction by FY 2020 from a FY 2008 baseline	Cumulative percent reduction at the end of- FY 10: 27.1% increase instead of a decrease FY 08 Baseline: 22,756 mtCO ₂ e FY 20 Goal: 19,798 mtCO ₂ e	Plan being developed to meet the goal.
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	Do you have a policy or standard in place for new construction and major renovations to be LEED Gold certified - Yes Do you have a policy or standard in place to meet high performance sustainable building guiding principles for projects less than \$5M – Yes	LEED Gold for projects over \$5M and HPSB Guiding Principles for projects under \$5M has been established as a Laboratory requirement.
15% of existing buildings larger than 5,000 gross square feet (GSF) to be compliant with the five guiding principles (GP) of HPSB by FY 2015	Number of buildings (and SF) needed to meet the GP goal: 5 (and 262,487 sf) Number of buildings (and SF) that meet GP : 7 buildings with 388,530 sf Number (and SF) added in FY 10: 5 buildings with 244,451 sf of space	Plan being developed to achieve as close to 100% as possible.
16% water intensity reduction by FY 2015 from a FY 2007 baseline, 26% by FY 2020	Cumulative percent reduction at the end of- FY 10: 28.9% FY 07 Baseline: 66.88 gallons per sf FY 15 Goal: 56.18 gallons per sf	Plan is to meet the 16% goal by 2015.
20% water consumption reduction of industrial, landscaping, and agricultural (ILA) water by FY 2020 from a FY 2010 baseline	FY10 Baseline: 97,552,000 gallons FY 20 Goal: 78,041,600 gallons	Plan is being developed to meet the goal by 2020.

2. Goal Performance Review and Plans

2.1 Scope 1 & 2 Greenhouse Gas Reduction

PNNL will reduce its GHG Scope 1 and 2 emissions by 28% by 2020, as compared to FY 2008 baselines. PNNL will encounter challenges in meeting these goals along with offsetting the GHG associated with expected programmatic growth by 2020.

In order to achieve this goal, PNNL will aggressively proceed with projects, operational improvements, and additional actions needed to meet the GHG requirements. This will involve acquiring funding from various sources, along with management emphasis and behavioral changes.

2.1.1 *Energy Intensity Reduction.*

The purpose of this goal is to reduce energy intensity by no less than 30% on average by FY 2015, relative to the site/facility energy use in FY 2003.

PNNL will reduce its energy intensity by at least 30% by 2015. PNNL is accomplishing this goal by a combination of energy savings projects and operational efficiencies.

The PNNL 2003 energy intensity baseline is 198 kBtu per gsf. Between 2003 and 2010, the energy efficiency and operational improvement projects have offset energy use increases from additional staff and equipment resulting in a net 8.9% energy intensity reduction.

2.1.1.1 *Performance Status.*

PNNL's current energy intensity, based on its EMS4 FY 2010 data as of November 15, 2010 is 176 kBtu/ft² which is an 8.9% reduction as compared to the FY 2003 baseline of 198 kBtu/ft². A copy of PNNL's EMS4 Energy Report dated 11/15/10 showing the 2010 energy consumption is attached (Appendix D).

A copy of the final FIMS list of buildings, dated November 15, 2010, excluded from the energy intensity goal and a copy of the exclusion self certification form (Appendix C) is attached. A FIMS schedule, along with other database schedules, can be found in Appendix B.

2.1.1.2 *Planned Actions.*

PNNL plans to implement several energy efficiency projects between now and 2015 that will significantly reduce energy intensity compared with the FY 2003 baseline. The Laboratory selects projects primarily by evaluating life-cycle costs (less than or equal to 25-year simple pay back is the initial goal). See Tab 3 of the Consolidation Energy Data Report (CEDR) spreadsheet which lists projects that, if implemented, have the potential to reduce energy use by approximately 43% by the end of 2015. (Appendix A) The Laboratory is considering a Utility Energy Services Contract (UESC) through the Bonneville Power Administration (BPA) to implement energy retrofit projects in several facilities.

The Laboratory has several data centers with increasing power requirements. Although the data centers are exempt from energy intensity goals, PNNL is striving to reduce data center energy use for multiple reasons including GHG reduction. Improvement initiatives include high efficiency power transformers, free cooling, chiller optimization, and utilization of virtual servers. The Information Technology Department is investigating various methods of managing the energy consumption of the thousands of personal computers at PNNL.

The Laboratory has started a retro commissioning campaign; four buildings were completed in FY 2010. Retro commissioning efforts in several other buildings were started in FY 2010 and will be completed in FY 2011. Although we do not have an exact projected energy reduction from the retro commissioning effort, it is anticipated that the reduction will contribute between 5 – 7% toward the 30% reduction goal.

PNNL's operational model will create a building operation command center (BOCC) — the BOCC will utilize advanced metering data, building control system graphics, additional use of HVAC and lighting setbacks and Laboratory-developed diagnostic display software to optimize building operations.

PNNL's Facilities and Operations (F&O) division recently reorganized to integrate energy management, building engineering and facility operations into a single organization for greater accountability and focus on meeting the Laboratory's energy and GHG goals. The strategies mentioned above demonstrate our integrated, multi-pronged approach to achieve the Laboratory's goals as part of our comprehensive energy management program.

2.1.2 Increase Departmental Renewable Energy Consumption.

This goal requires PNNL to have 7.5% of its electricity consumption from renewable energy sources by FY 2013.

2.1.2.1 Performance Status.

In FY 2010, PNNL purchased RECs to offset the GHG emissions for 69.9% of its electrical use. Construction is also underway for an onsite 125 kW PV array at the Environmental Molecular Sciences Laboratory (EMSL) – a DOE national scientific user facility located on-campus – which houses our supercomputer datacenter. The PV project includes electric car charging stations and designated charging stations for R&D testing of emerging vehicle charging technologies.

2.1.2.2 Planned Actions.

PNNL will complete the EMSL PV array and electric car charging stations, as well as purchasing RECs to offset GHG emissions in FY 2011. Preliminary work has begun on collaborating with BPA and multiple local electrical users to establish the feasibility of installing a large (3 – 5 MW) solar PV or concentrating thermal array within the next five years.

2.1.3 *Reduce Departmental Fleet Petroleum Use by 2% Annually and Increase Alternative Fuel by 10% Annually over the Previous Year, relative to the FY 2005 baseline, and 75% of Fleet Acquisitions Consist of AFVs for Light Duty Vehicles by FY 2015.*

2.1.3.1 *Performance Status.*

The Laboratory's fleet is primarily composed of light duty pick-up trucks, mini-vans, cargo vans, SUVs, medium duty pick-ups, vans, and heavy duty delivery trucks. The Laboratory's FY 2010 consumption of gasoline increased 9% compared to FY 2009. The cumulative reduction as compared to the FY 2005 goal is 7%. The consumption of alternative fuel (E-85) has increased by 94% as compared to the FY 2006 baseline. Currently, the Laboratory's fleet consists of 74 light duty vehicle and 41 (or 55%) are alternative fuel vehicles.

2.1.3.2 *Planned Actions.*

PNNL is planning to improve the fleet performance by:

- Improve E-85 usage by encouraging proper fueling of flex fuel vehicles via newsletters and other internal communication tools.
- Continue to procure AFVs, when available. On average, 8-10 AFVs are added annually to the PNNL fleet. The acquisition of AFVs and/or plug-in electric/hybrid electric vehicles is a key strategy, enabling continuous reduction of gasoline consumption.
- "Right size" fleet capacity by evaluating current fleet make-up (e.g., vehicle size, number and types). An analysis will be conducted to determine the minimum number of fleet vehicles necessary to support Laboratory's missions. This analysis will include an evaluation of fuel-efficiency of current fleet vehicles. Older, inefficient vehicles will be replaced with high-efficiency vehicles.

2.1.4 *Metering*

This goal requires PNNL to install metering devices, advanced or standard, to the maximum extent practicable in each building and other facilities and grounds for electricity, natural gas, and water.

2.1.4.1 *Performance Status.*

PNNL is currently on schedule to complete metering installations, and plans to have all metering installed by the dates outlined in the Order.

See Tables 1-5, a-d of the CEDR Worksheet, 2010 Data Report for Current Status.

2.1.4.2 *Planned Actions.*

PNNL will implement our approved Advanced Metering Plan.

2.1.5 Cool Roofs.

This goal describes PNNL's current state of enhancing overall building thermal performance for new roofs.

All new roofs will have a thermal resistance of at least R-30 and be solar reflective, consistent with DOE Secretary Chu's memorandum of June 1, 2010. PNNL is institutionalizing the values and systems as detailed in the memo.

2.1.5.1 Performance Status.

PNNL has eight cool roofs, and all future roofs will be cool roofs to comply with the Secretary's goal. They are being reported in the FIMS database.

2.1.5.2 Planned Actions.

Engineering standards for roofs are being updated to require cool roof specifications for facility improvements and in the terms and conditions for new construction contracts.

2.1.6 Training.

DOE O 430.2B requires that personnel at each site be trained 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.

2.1.6.1 Performance Status.

PNNL is funding trained staff to use the advanced metering data, building control system and other electronic means to optimize building operations and energy use. Several staff members are Certified Energy Managers (CEM) while select energy managers have results-based energy goals in their performance evaluations.

2.1.6.2 Planned Actions.

PNNL is establishing the BOCC as a place to utilize the advanced metering data for efficient operations, building control systems, and other electronic means.

In addition, outreach and incentive programs will be initiated to motivate employees to minimize waste and become more efficient in their use of energy, water and green products and services.

Staff will continue to attend GovEnergy and Labs 21 to enhance their current knowledge base. By FY 2011, all employee orientation programs will include energy conservation and recycling topics.

2.1.7A Behavior Change

During FY 2010, Laboratory senior leadership committed to implement a sustainable process to assess, measure, and continuously improve PNNL's operating culture. It is the Laboratory's practice that operational excellence is an integral component to achieve mission success. The results of this holistic approach will stimulate excellence in all business objectives (such as safety, security, quality, productivity, sustainability, and economic prosperity). This discovery process, governed by senior leadership, was founded on a set of guiding principles for operational excellence that describe what staff should "believe," "know," and "do" to prevent negative impacts to science and technology program activities.

The operational culture at PNNL was analyzed using a set of PNNL's Credo for Operational Excellence, which defines the desired culture as the basis for measurement and analysis. The credo focuses on four themes: leadership, engagement, continuous improvement, and risk management. Performance indexes were developed for all four themes, and goals for each index were set to distinguish outstanding and world-class performance for quantitative measures. Data indicate that overall, PNNL's already strong operational performance is very close to the "outstanding" goal and the Laboratory is firmly on a continuous improvement path. The improvement strategy used to improve a culture of operational excellence will eliminate cultural barriers and take action on specific predictive elements of staff engagement to reduce operational incidents significantly and improve many aspects of operational performance.

PNNL integrates the principles of conservation, waste minimization, and resource protection into all of our work activities. Since 2002, we have used an ISO 14001 registered EMS to help us continuously improve upon our performance through a rigorous process of goal-setting, planning, monitoring, and reporting. PNNL's EMS is spear-headed by a core team of PNNL subject matter experts. This group works by implementing best practices to continually improve upon previous performance. Annually, stewardship goals are selected by the EMS core team to further enhance Laboratory's performance and foster behavior changes.

2.1.7 SF₆ Reduction

The Strategic Sustainability Performance Plan (SSPP) commits DOE to "acquire SF₆ capture and storage equipment, develop training, and deploy SF₆ capture program at key DOE sites..."

2.1.7.1 Performance Status.

PNNL reported FY 2010 three-year rolling average SF₆ usage of 160 lbs in Pollution Prevention Tracking and Reporting Systems. This constituted about 2% of PNNL's estimated CO₂eq emissions in the year. Purchased containers of SF₆ are tracked in a Chemical Management System until removed from inventory, at which time they are assumed to be empty and the contents emitted in the year of removal. Known uses at this time include as a tracer gas, as a dielectric in laboratory equipment, and in laboratory research processes. No SF₆ is currently recaptured. A comprehensive inventory of potential sources has not been conducted.

2.1.7.2 *Planned Actions.*

PNNL doesn't have a significant amount of SF₆ in inventory. Our activities will focus on reducing inventory on-hand, identifying potential replacement products, and capturing leaks.

A pollution prevention opportunity assessment will be conducted with the participation of research staff to attempt to identify alternative technology to replace SF₆ as an atmospheric tracer. This is anticipated to include identifying tracers with lower global warming potentials (GWP) and the associated analytical preparation, release, sampling and analysis alternatives and costs.

An inventory of facility and research equipment and processes using SF₆ will be created including approximations of emissions as a pollution prevention effort. The inventory will serve as the basis for potential future plans for capturing and recycling SF₆ and leak detection.

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

This goal describes PNNL's current state of GHG emissions and plans to reduce them.

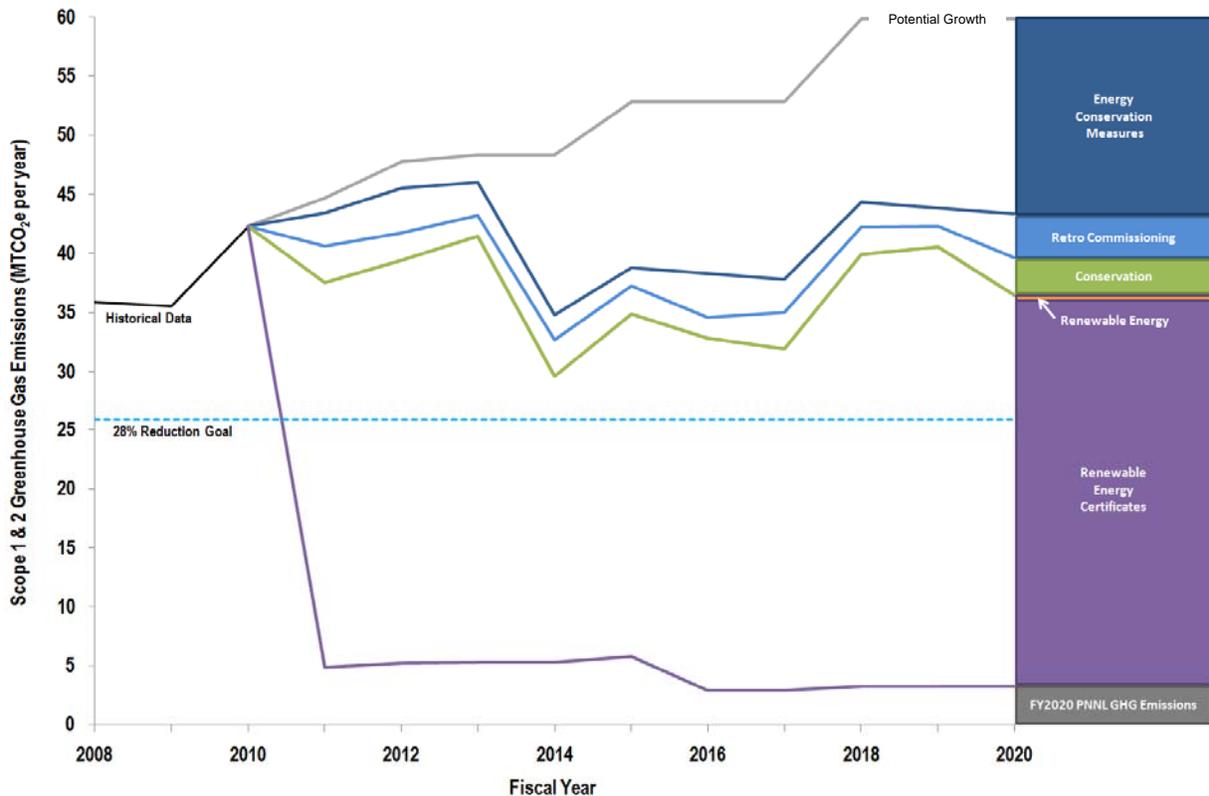


Figure 1. Overall Reduction of Scope 1 & 2 GHG Emissions.

2.1.8.1 Performance Status.

Despite our efforts to decrease Scope 1 and 2 GHG emissions, the mission, employee growth and new computational mission capability increased our GHG emissions in FY10. See the CEDR worksheet “New Construction” tab for details on new construction projects. However, our purchase of RECs in FY 2010 — because of their location in Oklahoma and Georgia — have offset more than 77.5% of our scope 1 & 2 GHG emissions.

2.1.8.2 Planned Actions.

Our multi-pronged method to achieve the long term goals will include energy conservation measures and infrastructure improvements, retro commissioning and continuous monitoring of Laboratory facilities, on-site renewable power generating projects, and training and education of existing and new staff to foster behavioral change and conservation in the office and laboratory environment. As this strategy is implemented, PNNL’s efficiency will increase, and REC purchases will be scaled accordingly.

Through better vehicle usage guidelines and acquisition of additional hybrid electric and flex fuel vehicles, the Site will realize further reductions in fleet emissions. As part of this commitment, we have installed the infrastructure for plug-in hybrids and electric vehicles at our main campus. We also set a goal that all of our alternative and flex fuel vehicles will run exclusively on bio-fuels whenever the fuel is available.

2.2 Scope 3 Greenhouse Gas Emissions Reductions

This goal describes PNNL’s current state of Scope 3 GHG emissions and plans to reduce them.

2.2.1 Performance Status.

PNNL’s FY 2010 scope 3 emissions totaled 28,930 MTCO_{2e}, or 41% of PNNL’s total GHG inventory. Business travel was the largest contributor to PNNL’s FY2010 scope 3 emissions at 63%, followed by employee commute (30%), and transmission and distribution (T&D) losses (7%). Emissions from contracted solid waste disposal and wastewater treatment made up less than 1% of scope 3 emissions.

PNNL’s scope 3 emissions increased by 27.1% compared to FY 2008. This increase in scope 3 emissions is primarily attributed to an increase in the number of employees, business volume, and sales at the Laboratory. Employment at the Laboratory increased by 17% in FY 2010 compared to FY 2008, and is estimated to increase in subsequent years. Projections indicate that by FY 2017, PNNL may have over 5,400 employees (a 30% increase compared to FY 2008). Business volume increased by 26% in FY 2010 compared to FY 2008. All of these conditions, which will enable us to achieve our DOE missions, pose significant challenges to PNNL achieving scope 3 emission reduction targets.

Business travel emissions will remain a challenge to reduce in future years. PNNL is located on the west coast, over 3,000 miles from our major government clients in Washington, D.C., which

contributes to our higher baseline in comparison to other sites. Also, fulfilling our nuclear nonproliferation mission has required extensive international travel, which contributes substantially to our travel emissions. Furthermore, there are no direct flights to our primary destinations (i.e., Washington, D.C.) making connecting short- and medium- range flights to Salt Lake City, Denver, or Seattle a prerequisite for most travel.

2.2.2 *Planned Actions*

Although achieving a 13% reduction in scope 3 emissions will be challenging given PNNL's site location, specific travel requirements for research work, and the upward trend in the number of employees and business volume, PNNL has identified a number of opportunities for reducing emissions from these sources.

Business travel:

- Targeted communications campaign to travelers: Launch a communications campaign with technical group managers and staff to describe business travel emissions and reduction targets, and to share strategies staff can use to support these targets. These include encouraging staff to talk with their Federal clients about our common GHG goals and defining opportunities to consolidate trips and use video, web, and teleconferencing in place of travel. Staff will also be encouraged to reduce the use of rental cars while on travel.
- Assess current travel patterns: Survey frequent travelers to understand current travel patterns, and identify factors that would facilitate use of non-travel alternatives (e.g., web conferencing), and factors that currently impede their use. Once an understanding of travel patterns is developed, targets could be set for frequent destinations. For example, reducing Washington, D.C. trips by 100 would reduce business travel emissions by 1% from FY 2008 totals.
- Facilitate use of travel alternatives: Work with staff to effectively manage barriers to video- and web-conferencing.

Employee Commuting:

Limited public transportation options in the region surrounding the main PNNL site is a significant barrier to reducing employee commuting emissions. However, PNNL plans to implement strategies including:

- Increasing participation in formal telecommuting or compressed work week schedules.
- Incentivizing public transportation through reduced fare bus passes.
- Working with the local transit authority to encourage and enable carpooling/vanpooling.

PNNL does not plan to actively manage wastewater emissions, as it can only be controlled by reducing staff numbers under the current accounting methodology. Additionally, going forward we are currently projecting growth in staff numbers to fulfill our project obligations. T&D losses

will be managed as a result of our scope 2 emission reduction efforts. Waste management emissions will be actively managed as described in Section 2.1.7.

2.3 Comprehensive Greenhouse Gas Inventory

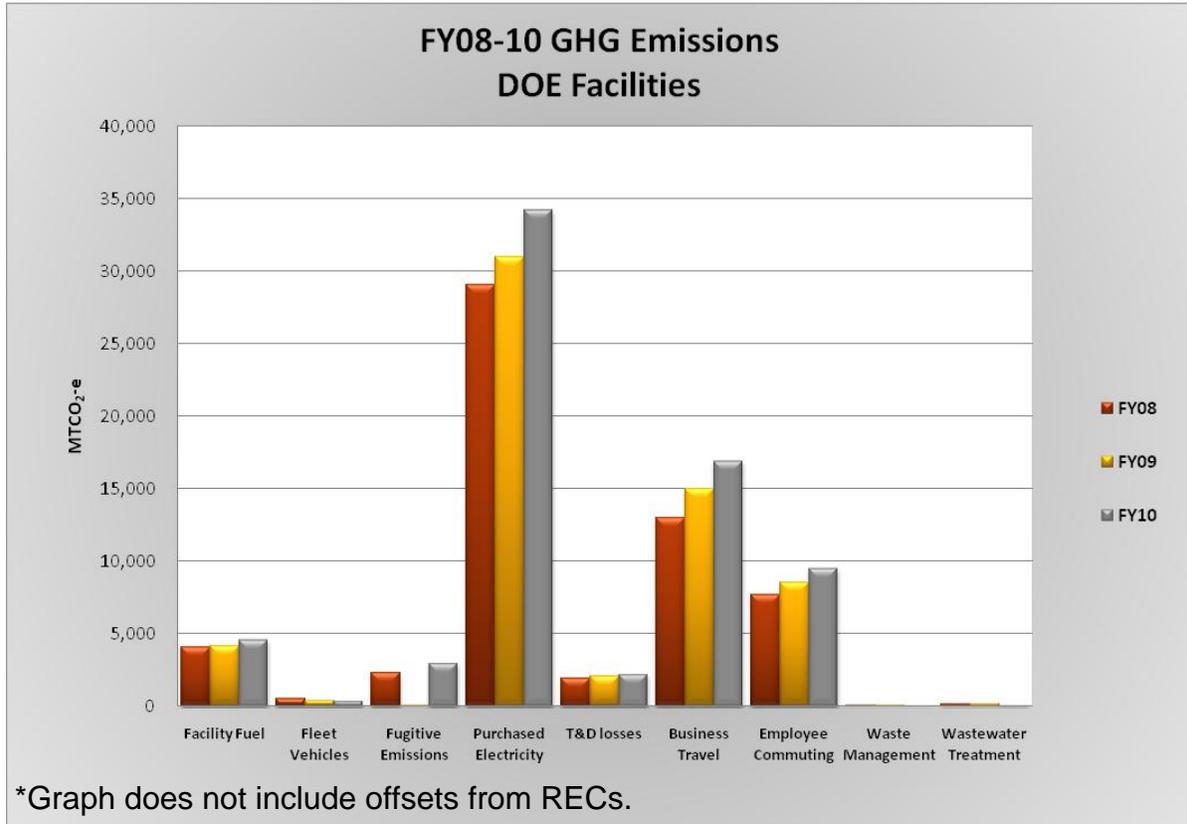


Figure 2. DOE Facilities: Scope 1, 2, and 3 GHG Emissions.

2.4 High Performance Sustainable Design

This section will describe plans to achieve high performance sustainable buildings, as described in DOE Order 430.2B, 4.1 (1) & (2) and Attachment 1.7.a-c.

To address the requirements in order 430.2B, PNNL has made a commitment to pursue the U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED®) Gold certification for all new construction and address the High-Performance and Sustainable Buildings (HPSB) *Guiding Principles* for existing buildings.

As of September 2010, 22% of PNNL buildings meet the HPSB expectations given the buildings that have achieved LEED certification, with the ultimate goal of meeting 100%.

Meeting High Performance Sustainable Building Goal

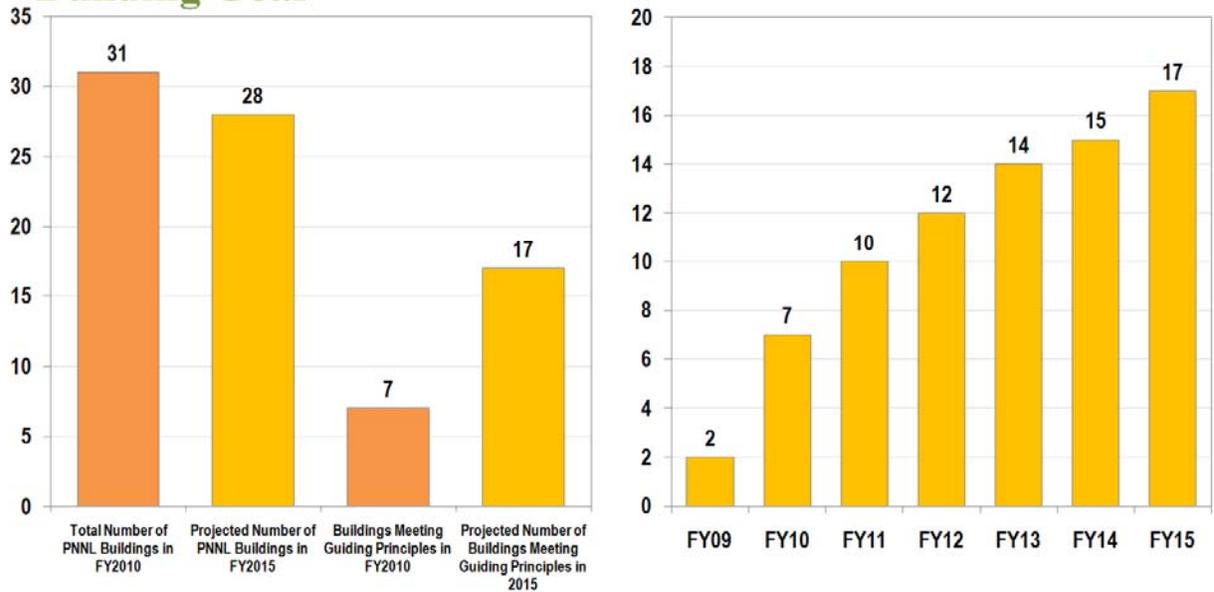


Figure 3. Meeting High Performance Sustainable Building Goal.

2.4.1 HPSB New Construction

Section 4.d of DOE 0 430.2B stipulates that all new buildings and major renovations at CD-1 or lower (in other words not yet obtained CD-2), with a value exceeding \$5 million, must achieve the LEED® Gold certification. Any buildings below the \$5 million threshold will be required to meet the *Guiding Principles*. In addition, per Section 109 of EPACK 2005, all new buildings in design shall be designed such that their energy consumption is 30% below the ASHRAE 90.1 standard.

2.4.1.1 Performance Status.

In FY 2010, PNNL received notification of LEED Gold certification for the Biological Sciences Facility and Computational Sciences Facility, a 154,000 square-foot laboratory facility. Construction was completed for the Physical Sciences Facility (5 buildings, 244,000 square feet) and LEED Silver certification was received in December 2010.

2.4.1.2 Planned Actions.

No new construction is funded for the near term.

2.4.2 *HPSB Existing Buildings*

Section 4.d(1) of DOE O 430.2B states “all programs that own, lease, or 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 shall “establish a time line for execution coupled with specific performance measures and deliverables designed to achieve [the Order’s goals].” EO 13514 and the SSPP further clarify the goal to be 15% of the number of buildings – not square footage – and that only a building greater than 5,000 square feet is subject to the goal. Additionally, EO 13514 and the SSPP require 15% of the buildings meet the *Guiding Principles* by 2015 while stipulating continued progress towards 100%.

2.4.2.1 *Performance Status.*

PNNL has assessed all of its existing buildings compared to the *Guiding Principles* using the checklist provided in EPA’s Energy Star Portfolio Manager. As of September 2010, none of PNNL’s existing buildings meet all of the *Guiding Principles*. Generally the *Guiding Principles* that most buildings do not achieve include:

- Energy use reduction
- On-site renewable energy (*Note: By the end of 2010, PNNL’s first on-site solar photovoltaic array will be installed.*)
- Indoor and outdoor water use reduction
- Moisture control
- Ventilation and thermal comfort

In some cases investments are needed for building improvements. In other cases we have identified the need for additional data collection, subcontract language modifications and updated documentation for our existing processes.

2.4.2.2 *Planned Actions.*

In FY11, PNNL will examine the gaps and will pursue LEED for Existing Buildings (EB) – Gold certification for up to three buildings. The LEED-EB certification will be used to document PNNL’s buildings meeting the *Guiding Principles* expectations. In FY12 and beyond, PNNL plans to continue to pursue LEED-EB certification for viable buildings as the mechanism to address our goal of continued progress towards 100% of PNNL buildings meeting the *Guiding Principles*.

2.5 Regional and Local Planning

This section will describe plans to meet regional and local planning goals, as described in EO 13514.

2.5.1 *Performance Status.*

PNNL has partnered with local and regional planning authorities, including the Tri-Cities municipal governments, the State of Washington, and regional power suppliers, to advance PNNL's sustainability objectives in three key areas: regional transportation, energy efficient buildings, and renewable energy generation.

Specific activities during FY2010 included:

- Transportation
 - Worked with the regional transit authority, Ben Franklin Transit, to initiate bus service to the PNNL campus from when none existed prior to 2008. This service was expanded in 2010 to include six morning and six evening pick-up and drop-off options.
 - Sidewalks were added as part of the Physical Sciences Facility building construction to further integrate with the Richland campus walkways.
- Energy efficiency buildings
 - Worked with Washington Department of Ecology to procure a permit to operate an innovative ground source cooling system for the Biological Sciences Facility/Computational Sciences Facility.
- Renewable energy
 - Initiated discussions with BPA and potential third party funders to explore a large scale renewable power project on the PNNL campus.
- Resource management
 - Coordinated with federal, State of Washington, tribal and local stakeholders on various ecosystem management and restoration activities for the Hanford Reach on the Columbia River and the Hanford Reservation. Laboratory Director Mike Kluse serves as co-chair for the Hanford Reach Interpretative Center Capital Campaign, and Battelle contributed \$1 million toward this campaign during 2010.

2.5.2 *Planned Actions.*

Key actions that PNNL will take to support the local and regional planning goals described in the SSPP for FY 2011 include:

- Ensure participation in regional transportation planning is incorporated into site policy and guidance documents (by September 2011).
 - An employee commuter survey, conducted at the beginning of FY 2011, will be used to assess current modes of transit used, employee willingness to consider alternative modes of transit, and incentives and deterrents to using alternative modes. This information will be used to define appropriate initiatives for reducing the transportation burden to the PNNL campus increasing use of alternatives. Specific strategies such as working with the local transit authority to facilitate vanpooling among employees will be explored, and will be incorporated into PNNL's FY 2011 SSP.

- Identify regional transportation planning, ecosystem, and environmental management initiatives affecting our site and opportunities to work with local authorities to align energy policies and siting of renewable energy infrastructure (by February 2011).
 - Continue to work with local and regional stakeholders on a possible on site renewable energy project.
 - Assess state of interaction between our site and the local/regional organizations (by September 2011).

2.6 Water Use Efficiency and Management

This section will describe PNNL's water management plan, as specified by EISA Section 432, as well as PNNL's water use efficiency goals.

2.6.1 **Water Efficiency.**

PNNL will reduce water consumption for the following areas:

- Potable water, reducing water intensity by no less than 16% by FY 2015 relative to the established FY 2007 baseline.
- A 20% reduction of industrial/landscaping/agriculture (ILA) water consumption is being sought by FY 2020 from a FY 2010 baseline.

2.6.1.1 *Performance Status.*

PNNL has developed a water management plan, budgeted funding, and are implementing water conservation technology and practices to achieve, at a minimum, 2% or greater annual potable water reductions that will allow us to achieve the overall goal at or prior to the deadlines.

Potable Water:

Proactive water conservation practices prior to the recent DOE order have reduced water consumption at the site and provided additional challenges in achieving the reduction goals. The established FY 2007 potable water intensity baseline is 67 gallons per gross square foot (GSF). Many of the newer facilities are metered however many of the older government facilities at the site were not individually metered, only proportional estimates of a total site-wide water meter. The advanced meters that have been installed provide pulse outputs to the site energy management system, allowing for trending, continuous monitoring, and alarming of water flows. This advanced metering on the potable water has already highlighted several water conservation opportunities. Measures implemented to date include: 1) installation of high efficiency urinals (HEU), pint flush in 21 primary facilities – saving 1.3 million gallons per year (95% of the potential) 2) installation of localized equipment chillers for eliminating non-contact cooling water – saving 1.4 million gallons per year 3) installation of high efficiency toilets and hands free dual flush flushometers 4) installation of hands free faucets with flow restrictor aerators on all lavatory sinks.

ILA:

Irrigation systems are currently being reviewed to estimate the water usage and the reduction potential.

2.6.1.2 Planned Actions.

Potable Water:

Facility audits on water usage along with monitoring metering trends have identified the following potential measures that are currently being designed for implementation in the next few years: 1) completing installation of HEU's in all facilities 2) completing retrofits of high efficiency toilets in facilities 3) evaluation a water treatment system that will eliminate cooling tower blowdown and potentially save approximately 2.7 million gallons per year. Additionally the relocation of ~1000 staff and R&D equipment from 3 major 300 area facilities has started and will be completed in FY2011. The water consumption in the old facilities will be eliminated as the facilities are vacated. Systems in the replacement facilities have been designed to eliminate or significantly reduce water use associated with the relocated R&D equipment.

ILA:

PNNL has initiated a plan to reduce acreage that will be irrigated and will go to low-water use landscaping. One project scheduled for FY2011 will save approximately 4.1 million gallons per year. Irrigation controllers are being evaluated that incorporate software programs that modify watering schedules to match evaporation rates thus eliminating over watering.

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."

2.6.2.1 Performance Status.

The design and construction of any new facilities will incorporate storm water management that will meet or exceed the requirements of EISA Section 438.

2.6.2.2 Planned Actions.

The design of any new facilities will evaluate using either a green roof or the use of rainwater cisterns. Parking lots will use concrete paving blocks that are designed to infiltrate runoff. Bio-swales will be used adjacent to asphalt roadways and other hard surfaces to facilitate infiltration.

2.7 Pollution Prevention (P2)

PNNL has grouped DOE's P2 goals into three categories: Waste Reduction, Toxic Chemical Reduction, and Paper Use.

In Waste Diversion, the following sub-goals will assist in PNNL's overall waste reduction goal: to divert at least 50% non-hazardous solid waste by FY 2015, excluding construction and demolition (C&D) debris; to divert at least 50% C&D material and debris by FY 2015, increase diversion of compostable and organic materials from the waste stream, increase source reduction of pollutant and waste.

PNNL will reduce its toxic chemicals inventory by: reducing and minimizing the acquisition, use, and disposal of hazardous chemicals and materials; implementing integrated pest management and landscape management practices to reduce and eliminate the use of toxic and hazardous chemicals and materials; increasing the Laboratory use of acceptable alternative chemicals and processes; decreasing the Laboratory use of chemicals to assist in achieving FY 2020 GHG reduction targets; and reporting in accordance with Section (301-313) of the Emergency Planning and Community Right-to-Know Act of 1986.

To assist in the paper use reduction category, PNNL will reduce printing paper use, and increase use of uncoated printing and writing paper containing at least 30% post-consumer fiber.

2.7.1 *Performance Status.*

PNNL's EMS has been certified to the ISO 14001 standards since 2002. Annually, the Laboratory sets environmental objectives and targets to minimize environmental impacts from Laboratory's operation and search activities. Goals are tracked and reported following the requirements provided in the ISO 14001 standards. In FY 2010, PNNL established goals to increase waste diversion, reduce laboratory chemical inventory, and improve EPP compliance paper purchases. Performance status related to those areas is described below.

Waste Diversion:

Solid Waste:

PNNL has a strong recycling program in-place for many waste streams (i.e., electronics, scrap metal, wood, paper, plastic, glass, tin, cardboard). PNNL also has excessing programs to reuse and redeployed surplus office products and electronics. In FY 2010, PNNL diverted 47% of non-hazardous waste. This is determined based on an estimated sanitary waste weight and the following avoided waste items:

- aluminum, brass, copper, scrap metal,
- books, journals, paper, mixed paper, plastic, cardboard, glass,
- compost,
- food and sod donations, and
- office furniture and office products donations.

C&D Waste:

PNNL has a wide variety of C&D work activities from large construction projects to small scopes of work. PNNL works to collect data on materials recycled but there are some improvements needed in the data collection process in order to obtain the percent of C&D recycled. For example, some of the C&D materials are commingled with routine recycling streams (e.g., scrap metal) and there are no requirements currently for contractors to report total waste generated.

Composting:

The Laboratory's current composting program relies on the PNNL Garden Club and staff volunteers. PNNL composted approximately 100 pounds per month, or 0.58 metric tons of food waste, in FY 2009 and FY 2010. In addition, there were several zero waste picnic events held in FY 2010 that resulted in 435 pounds, or 0.2 metric tons, of food waste donated to local farmers for hog feed.

P2 Program:

The fundamental mechanism for reducing waste at the Laboratory has been through our P2 assessments and the P2-Pays programs. P2 assessments are conducted to identify pollution prevention opportunities associated with operational process improvements and product substitution.

Three projects were selected for implementation in FY 2010: Establish Recycling Program for Pressurized Containers (\$5,000); Replace Gas-Purification Glovebox with Low-energy System (\$18,435); and Install Chillers Eliminating Single-Pass Cooling for Laser Systems (\$36,500).

Toxic Chemical Reduction:

Chemical Management:

PNNL has worked over the past few years to make improvements to chemical management. Some improvements include:

- Map out the chemical lifecycle processes, associated requirements and costs with the intent of streamlining operations
- Development of the ASIST (Asset Screening Information and Stewardship Tracking Tool) to track ownership of chemicals and guidelines on chemical disposition. PNNL has begun implementing ASIST to track property and chemicals throughout their lifecycles. In FY 2010, ASIST was used during staff moves into PNNL's new and remodeled facilities to help staff make informed decision about retaining assets based on the Laboratory capacity.
- PNNL implemented the ChemAgain chemical redistribution program to provide a means of collecting and redistributing usable chemicals. PNNL's award-winning ChemAgain program has successfully redeployed nearly 600 containers in FY 2010.

- PNNL's has developed a "Strategy for Risk-Based Chemical Management" to document a proposed methodology for implementation of an integrated, risk-based approach to managing chemicals as an opportunity for improvement. PNNL's strategy for implementing an integrated, risk-based approach differentiates between the varieties of chemicals used at the Laboratory on the basis of their level of impact to safety, operations, and contributions to the Laboratory's R&D Missions. The strategy takes into account the lifecycle of those materials, their impact on facilities, and the data generated and used by staff and management. In implementing this risk-based approach and by using impact to operations and contributions to the Laboratory's R&D Missions as the basis for driving appropriate levels of due diligence and resource containment, PNNL expects improved integration and effectiveness, and reduced costs while maintaining excellence in research and operations.

Integrated Pest Management (IPM):

PNNL has 14 state-licensed Private Commercial Pesticide applicators on our Grounds crew. Part of the certification program requires annual attendance at continuing education classes. In these classes they learn the latest trends in pest control, as well as the most current chemical and biological control agents and current legislative changes. All of our applicators are committed to the principles of IPM.

Our Grounds staff recognizes the responsibility to provide a clean and low pest environment at the Laboratory. We also strive to limit our control efforts to those absolutely required for optimal results. Our pest control methods begin with the lowest impact, escalating when required, and only to the level necessary for acceptable control. We are always looking for less toxic and more targeted methods of control and this is achieved mostly through our annual retraining courses for our pest control licensing process.

Paper Use:

Printing continues to be an essential element for conducting Laboratory's mission related work. However, many of the process are moving to electronic or "paperless" systems. For example, records are now being maintained electronic in the Total Record Information Management (TRIM) system, newsletters at all levels have moved to electronic distribution, training records are completed electronically, and conference rooms are equipped with audiovisual equipment that enable staff to deliver presentations electronically.

PNNL utilizes the Business-to-Business (B2B) program as the primary mechanism for purchasing office products. Through this program, vendors only offer products that meet PNNL requirements including the 30% post consumer content. Products are routinely evaluated and compliance with EPP requirements is reported by the vendors quarterly.

Some special paper purchases (e.g., brochures) are made through the purchase-card (P-card) process. In evaluating paper purchasing data, opportunities for improvement were identified for the P-Card area. Improved training for P-Card holders and targeted briefings with duplications and communications staff were held to reinforce requirements. The EPP compliance purchases for uncoated printing and writing paper products was reported to be 89% for FY 2010.

2.7.2 *Planned Actions.*

Waste Diversion:

While PNNL has a strong P2 program, the following initiatives have been established to improve waste diversion and to identify and address opportunities in our current programs.

Solid waste management:

- Characterize sanitary waste streams by assessing sanitary dumpster contents.
- Utilize the results of the sanitary waste assessment and the FY 2010 janitorial recycling survey to develop a waste diversion strategy. The strategy will include training, communications, and evaluate options for simplifying recycling (e.g., co-mingled).
- Foster culture and behavior changes in waste reduction by continuing to support “zero waste” events.

C&D waste management:

- Evaluate current C&D waste tracking and reporting process and identify changes necessary to better capture total wasted generated from C&D projects.

Composting:

- An evaluation of the existing composting program will be conducted to identify barriers and opportunities for improvement.

IPM: The Laboratory will continue utilizing best practices and look for opportunities to use less toxic products. We also plan to formalize the program by incorporating IPM principles into applicable procedures.

P2 Goals: PNNL will continue utilizing the goals setting processes to identify and implement P2 objectives and actions. For FY 2011, PNNL has committed approximately \$50,000 for the P2-pays.

Toxic Chemical Reduction:

Chemical Management:

PNNL will continue work on actions associated with improving the chemical management lifecycle and maintaining an effective chemical redistribution program. A risk-based Chemical Management pilot is planned for FY 2011. This work practice is expected to be implemented laboratory-wise, pending results of the pilot program

A pollution prevention assessment to reduce SF₆ fugitive emission is planned for FY 2011. Detailed description on this assessment is provided in Section 2.1.7.

IPM:

PNNL plans to formalize the IPM program by incorporating more details on IPM into our Grounds manuals and programs. PNNL will also continuously examine less toxic products and methods as a manner of continuous improvement.

Paper Use:

PNNL plans to utilize technology and encourage behavior to minimize paper use and enable automatic purchasing of 30% post-consumer content paper. Currently, network duplex printers are provided throughout the PNNL complex and most of the conference rooms are equipped with electronic presentation equipment to minimize hardcopy handouts.

The following actions are planned to improve paper use:

- Set printer and copiers to duplex printing by default,
- Encourage digital storage of records and files wherever the law allows, and
- Continue to procure uncoated printing and writing paper containing at least 30% post-consumer content.

2.8 Sustainable Acquisition

This section will describe the following sustainable acquisition goals:

PNNL will ensure 95% 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[®] 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. Additionally, PNNL will update the procurement plan, policies and programs to ensure that all federally-mandated designated products and services are included in all relevant acquisitions.

2.8.1 *Performance Status*

PNNL has ensured that new contracts contain requirements for products required to contain recycled content. In addition, purchases of non-compliant energy efficient products under the Purchasing Card program require written pre-approval from the Subject Matter Expert. Suppliers under the hosted catalogs are required to provide only compliant energy, water, recycled and bio-based products. For the procurement plan goal, Acquisition Guideline 24 was updated to ensure all Federally-mandated designated products and services are included in all relevant acquisitions. Also, P-Card Program updated to require the purchase of energy efficient products. Agreements with suppliers providing hosted catalogs will be updated to provide only compliant energy, water, recycled and bio-based products.

2.8.2 *Planned Actions*

PNNL will modify our risk assessment process to allow Subject Matter Expert review of all applicable contract actions to ensure the application of all applicable environmental requirements. This process will include new sustainability DEAR Clauses in applicable contracts, and the Laboratory will develop appropriate mechanisms to fulfill reporting requirements and track compliance with this goal. Continuing with these goals, PNNL will further strengthen the requirement for federally-mandated designated products in all purchasing programs as necessary.

2.9 Electronic Stewardship and Data Centers

This section will describe the following goals for electronic stewardship and data centers, as specified by DOE O 430.2B and the SSPP:

PNNL will 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 electronic products; update Laboratory's policy to reflect environmentally-sound practices for disposition of all excess or surplus electronic products; update Laboratory's policy to make sure that implementation of best management practices for energy efficient management of servers and federal data centers; identify ways to increase the quantity of electronic assets disposed of through sound disposition practices; and phase-in installation of dedicated meters for data centers.

2.9.1 *Performance Status.*

Power Management/Data Center:

PNNL has implemented a number of changes within the ISB2 data center to enhance facility efficiency. These changes have included: implementing an aquifer water heat exchanger to improve cooling by a factor of 13, virtualizing over 80% of our business system servers, which reduced the energy demand by 160kVA and saving approximately 1,500,000 kWh/yr, and placing power and interface cabling overhead to improve raised floor cooling air circulation.

PNNL will also institute in the Data Center hot/cold aisles, thereby minimizing air mixing, thus lowering the air temperature to the servers and raising the temperature of the return air to the heat exchangers. Additional changes include: replacing old UPS's with much more energy efficient UPS's with superior monitoring capability, installing water-side heat exchangers which increase efficiency and provide 'free cooling' during the colder days, and installed 240V in-row power distribution which saves copper and runs much more efficiently than 125V/208V.

A recent change is the implementation of duplex printing as the default configuration on all network printers that have the ability to perform the function.

Electronic Stewardship:

PNNL has established a policy to manage all excess or surplus electronic products in an environmentally-responsible manner has been established. Best practices to manage those products are:

- Redeploy equipment that meets the company's requirements to other staff. During FY 2010, 2568 computers were redeployed or internally transferred between custodians.
- Donate equipment that no longer meeting the company's requirements to school or community organizations.
- Computers that do not meet the Lab's standards and are not donated through the Computers for Learning program are sent to the Community Reuse Organization and are auctioned off with the proceeds going to the local economic development opportunity office.
- Recycle computers systems and other devices with no redeemable value.

2.9.2 *Planned Actions.*

Power Management/Data Center: This goal will be accomplished through a variety of mechanisms, including the use of power management, optimizing the configurations of data centers, monitoring power consumption in data centers, minimizing the number of systems that exist in general office space, and educating users on how they can be conscientious consumers.

Additional actions to improve data center efficiency include:

- Installing newer more energy efficient UPS's and transformers.
- Moving cooling as close to the load as possible reducing moving air costs (fans).
- Employing in-row and direct chip cooling.
- Revamping 240V power distribution to use modular in-row Power Distribution Units that are fully sensed.
- Continuing to virtualize systems to reduce the physical footprint and reduce energy use.
- Using ceiling plenum as a hot air return.

- Using Data Center Pro Tool Suite for data center analysis for energy use and sustainability parameters.

Potential energy conservation initiatives in the desktop/end user computing space that are under consideration in the laboratories initiative planning and prioritization process include increasing utilization of virtual desktops and more energy efficient end user devices, such as thin clients. The use of virtual desktops will also reduce the need for users to have multiple systems in their offices. Other potential conservation initiatives include: implementing a power management strategy for desktops, and conducting an evaluation and pilot for the use of public cloud for targeted services.

Electronic Stewardship: PNNL plans to continue to manage surplus or excess electronic products in an environmentally responsible manner.

2.10 Site Innovation

F&O and Engineering staff is partnering with the Energy Programs research staff to leverage various R&D-developed systems and software to enhance the building operator function. Through partnering, the Laboratory was able to help stimulate the economy and retain jobs during the recession by effectively and efficiently using ARRA funding. The funding allowed the Laboratory to advance its sustainability goals by installing LED parking lot and outdoor lighting, replace windows, construct a 125 kW PV array, and reduce water intensity for landscaping.

Below are three areas of innovation where sustainability-related research has been implemented at the Laboratory:

- Climate Neutral Communities Initiative – A team of PNNL staff members with GHG management and high performance building design expertise led the development of a detailed plan for getting the PNNL site to climate neutral by 2020. This included a detailed analysis of the GHG abatement and cost of a set of conservation, energy efficiency, and onsite renewable opportunities. This was carried out with project funding from the Federal Energy Management Program (FEMP). Facilities and operations staff members provided data and feedback throughout the process.
- Decision Support for Operations & Maintenance (DSOM) – DSOM is an advanced supervision and diagnostic tool developed by PNNL to reduce energy use, reduce operations and maintenance costs, and extend equipment life in facilities. DSOM has been deployed across select PNNL facilities to support daily building operations monitoring. It has resulted in many “informed decisions” that have reduced the energy use in those buildings.
- Grid-Friendly™ charger – The Grid Friendly™ charger was developed by researchers at PNNL to simplify electric vehicle charging, which will be particularly important as they grown in popularity. The charger technology initiates the communication between the vehicle and the grid to decide the optimal time to re-charge. On the PNNL campus, we have installed car charging stations at multiple buildings; at our

supercomputing building we have designated a few stations for scientists to use and test their Grid-Friendly™ charger box.

3. Return on Investment Evaluation

3.1 Performance Status

Based on the return on investment criteria and the level of development of scope and implementation cost estimates of the projects listed on Tab 5 in the CEDR worksheet, our diverse approach will include the use of indirect funding, appropriated capital, and third party alternative financing. Life cycle cost effectiveness factors such as net-present value, savings-to-investment ratio, and internal rate of return were calculated using standard methodologies found in the NIST Handbook: Life-Cycle Costing Manual for the Federal Energy Management Program. As noted in Tab 5 of the CEDR, all proposed or planned projects have undergone substantial technical and economic analysis in preparation for possible submission to the budget process.

3.2 Planned Actions

Currently planned and anticipated PNNL projects are forecasted to achieve the DOE Corporate goals in energy reduction, fleet, water, and buildings by FY 2015. PNNL will continue to refine the scope and estimated implementation costs and evaluate funding sources for financial and technical rigor, and seek appropriate funding sources over the next three years for those that are life cycle cost effective. The site's next budget request will be updated to include projects that will allow attainment of sustainability goals.

4. Sustainability Transformation Team

Collaboration among research and operations staff members is a well-established practice at PNNL. The Lab’s facilities and operations team regularly draw ideas and innovative technologies developed by scientists and engineers in PNNL’s research organizations, and incorporate them into site operations. PNNL scientists and engineers also benefit from the opportunity to pilot methodologies and technologies in a scalable operating environment.

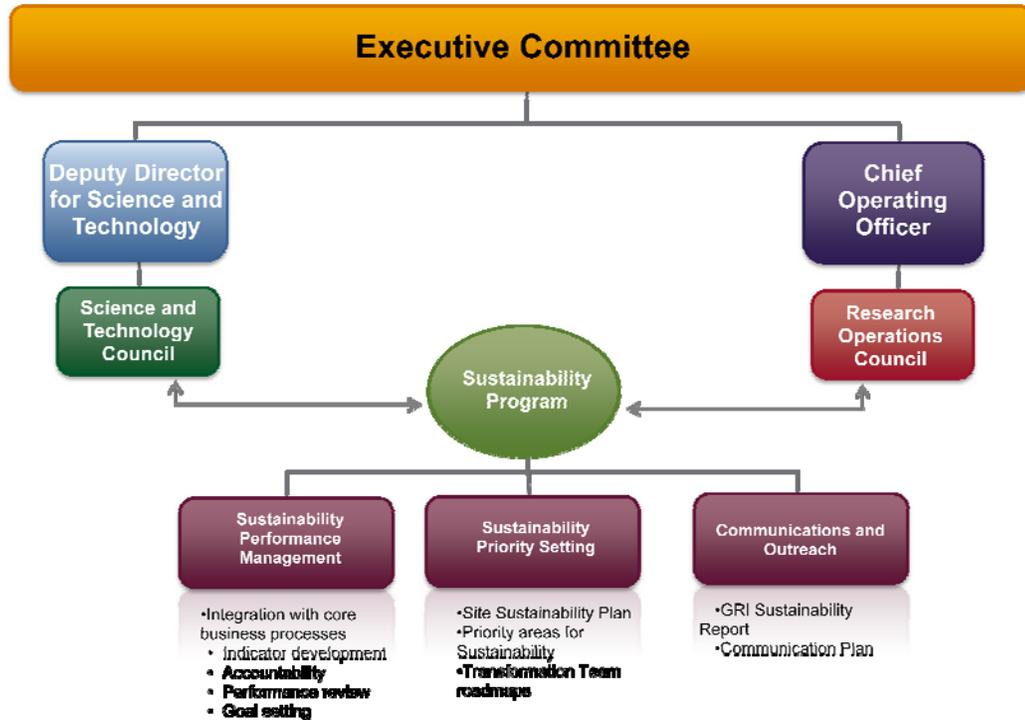


Figure 4. Sustainability Governance Model.

During FY 2011, PNNL intends to formalize this cross-cutting engagement with the formation of the Sustainability Transformation Team. The Sustainability Transformation Team will be composed of research scientists and facilities and operations staff members with reporting and management responsibility for PNNL’s facilities and fleet, and human resources. These staff will have the ability to influence policy (e.g., telecommuting) that could reduce PNNL’s environmental footprint, and research scientists who can bring innovative ideas and technologies to PNNL site plans. Specific members of the STT will change as sustainability priorities evolve.

During FY 2011 the team will establish a charter, hold regular meetings, influence sustainability priority-setting support, and help monitor progress against PNNL’s sustainability targets.

5. Management and Funding

5.1 Management

Management of sustainability at PNNL is comprised of three elements: Energy and Water Management, the EMS, and the Sustainability Governance Model. The Energy and Water Management Program is managed and implemented by F&O. PNNL’s EMS Core Team is comprised of responsible stewards and includes an R&D representative with high performance sustainable building design expertise. Other subject matter experts are invited to EMS core team meetings as required. Goal setting, program strategy, and suggested policy development are submitted through the Sustainability Governance Model, shown in Section 4.

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	93	93		
Energy Efficiency (non-data centers)	230	736	495	675
Energy Efficiency (data centers)		300	250	900
HPSB*				
Metering	200	270		
Cool Roofs			20	
Behavior Change				
Lighting		22		
All other	50	50		
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 Laboratory is considering a UESC through the BPA to implement energy retrofit projects in several facilities. We have established a list of energy conservation measures (most are listed on Tab 5 of the CEDR) that, when bundled, will create a viable UESC project.

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

6.1 On-Site Power production

In FY 2010, the Laboratory began constructing a 125 kW ground-mounted PV array with adjacent car-charging stations.

6.2 Purchasing off-site dedicated renewable or carbon free electrical energy

In FY 2010, the Laboratory engaged in community conversations for a large-scale, on-site, (or adjacent to our site) renewable power project.

6.3 REC Purchases

	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)*	58,143	58,143	60,000	65,000	50,000	50,000	60,000	60,000	70,000	70,000	70,000
Actual/Planned/ Estimated Cost**	\$57,513	\$65,313	\$72,000	\$78,000	\$60,000	\$60,000	\$78,000	\$78,000	\$91,000	\$91,000	\$91,000
Unit Costs (\$/MWHs)**	\$0.99	\$1.12	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.20	\$1.30	\$1.30	\$1.30

*the purchase plan should be based on the strategic plan for meeting GHG reduction goal in Section 2.1.8

**incremental cost

Appendix A – CEDR

CEDR Content

The Consolidated Energy Data Report (CEDR) consists of nine worksheets that should be completed by each site, as applicable, and included as part each site's SSP in a MS Excel electronic format. To assist with navigation of large tables, a key has been provided identifying the fields that have been pre-populated, fields that need to be completed, and optional fields to be completed should the information be applicable and available. In general, cells highlighted in orange should be completed.

Worksheet	Suggested Responsible Party	Overview	Action
Content	NA	Stand-alone overview of the CEDR tabs.	None
1 2010 Data Report	Facility/energy manager	Collects information on energy and water spending, and metering status.	If applicable, complete cells highlighted in orange. Edited and new data cells should be highlighted in light blue.
2 Operating On-Site Renewables	Facility/energy manager	Houses the list of active renewable energy systems at DOE sites to track progress towards renewable energy requirements in EPACT 2005 and DOE O 430.2B. Also used towards developing the site's GHG inventory.	Review pre-populated data and update as need be. If applicable, complete new data fields. Edited and new data cells should be highlighted in light blue.
3 Purchased Renewables	Facility/energy manager	Collects renewable energy purchases to track progress towards renewable energy requirements in EPACT 2005 and DOE O 430.2B. Also used towards developing the site's GHG inventory.	Review pre-populated data and update with FY 2010 purchased data. If applicable, complete new data fields. Edited and new data cells should be highlighted in light blue.
4 Source Energy Savings Credit	Facility/energy manager	Part of the <i>Annual Energy Report</i> to adjust site energy use accounting from projects — especially combined heat and power — that would change the accounting of site vs. source energy.	Complete worksheet, if applicable. Edited and new data cells should be highlighted in light blue.
5 Conservation & RE Measures	Facility/energy manager	Main worksheet that is used to track a site's planned energy and water conservation measures, in addition to future renewable energy systems. Used to project a site's future energy/water consumption based on savings.	Review pre-populated data and update as need be. If applicable, complete new data fields. Edited and new data cells should be highlighted in light blue.
6 Fleet Measures	Fleet manager	Tracks future fleet management strategies and their anticipated petroleum savings or alternative fuel use.	Review pre-populated data and update as need be. If applicable, complete new data fields. Edited and new data cells should be highlighted in light blue.
7 New Bldg Construction	Facility/energy manager	Tracks new construction projects and their requirements for meeting HPSB goals, EPACT 2005 30 percent better than ASHRAE, and storm water design requirements. Also projects energy and water consumption in the future.	Review pre-populated data and update as need be. If applicable, complete new data fields. Edited and new data cells should be highlighted in light blue.
8 Existing Bldgs HPSB	Facility/energy manager	Tracks compliance of existing buildings, or plans to gain compliance, with HPSB existing building requirements.	Review pre-populated data and update as need be. Edited and new data cells should be highlighted in light blue.
9 Data Centers	Data center manager	Inventory of DOE data centers along with basic energy management metrics.	Review pre-populated data and update as need be. Edited and new data cells should be highlighted in light blue.

FY 2010 Energy Management Data Report

Program: Department of Energy
 Site: Pacific Northwest National Laboratory
 Fiscal Year: 2010

Prepared by: Marc Berman
 Phone: (509) 371-7640
 Date: 12/14/2010

Note: Part 1, Consumption and Cost Data, in past Annual Energy Reports and CEDRs has been taken out. Instead data will be pulled from DOE databases: FIMS, EMS4, and FAST.

Requirements: See tables.

Instructions: Complete cells in orange. The information requested is specifically to complete DOE's Annual Energy Report. Edited and new data cells should be highlighted in light blue.

Source: As provided by sites in their FY 2010 CEDR.

ENERGY EFFICIENCY IMPROVEMENTS AND FUNDING

1-1. E.O. 13423/OMB Circular A-11 Direct Agency Obligations

	FY 2010		Projected FY 2011	
		(Thou. \$)		(Thou. \$)
Direct obligations for facility energy efficiency improvements, including facility surveys/audits		\$0.0		\$0.0
Estimated annual savings anticipated from obligations (Million BTU)	0.0	\$0.0	0.0	\$0.0
Estimated annual savings anticipated from obligations (Thousands Gal)	0.0	\$0.0	0.0	\$0.0

1-2. E.O. 13423/OMB Circular A-11 Awarded Energy Savings Performance Contracts (ESPCs)

	Annual savings (10 ⁶ BTU)	(Number/Thou. \$)
Number of ESPC Task/Delivery Orders awarded in fiscal year & annual energy (Million BTU) savings	0.0	0.0
Investment value of ESPC Task/Delivery Orders awarded in fiscal year		\$0.0
Amount privately financed under ESPC Task/Delivery Orders awarded in fiscal year		\$0.0
Cumulative guaranteed cost savings of ESPCs awarded in fiscal year relative to the baseline spending		\$0.0
Total contract award value of ESPCs awarded in fiscal year (sum of contractor payments for debt repayment, M&V, and other negotiated performance period services)		\$0.0
Total payments made to all ESPC contractors in fiscal year		\$0.0

1-3. E.O. 13423/OMB Circular A-11 Awarded Utility Energy Services Contracts (UESCs)

	Annual savings (10 ⁶ BTU)	(Number/Thou. \$)
Number of UESC Task/Delivery Orders awarded in fiscal year & annual energy (Million BTU) savings	0.0	0.0
Investment value of UESC Task/Delivery Orders awarded in fiscal year		\$0.0
Amount privately financed under UESC Task/Delivery Orders awarded in fiscal year		\$0.0
Cumulative cost savings of UESCs awarded in fiscal year relative to the baseline spending		\$0.0
Total contract award value of UESCs awarded in fiscal year (sum of payments for debt repayment and other negotiated performance period services)		\$0.0
Total payments made to all UESC contractors in fiscal year		\$0.0

1-4. EPACT 1992/DOE Order 430.2B Training

	(Number)	(Thou. \$)
Number of personnel trained in FY 2010/Expenditure	8	\$50.0

1-5a. EPACT 2005 Metering Of Electricity Use

(Note: If a building has an advanced and a standard meter, only account for the advanced meter.)

Fiscal Year	Standard Meters		Advanced Meters		Appropriate Buildings	
	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	Cumulative # of Buildings Metered	Cumulative % of Electricity Metered	# of Appropriate Buildings for Metering	Cumulative % of Buildings Metered
2010 Report	4	19.2%	19	89.2%	23	100.0%
2011 Planned	3	8.2%	22	91.8%	23	100.0%
2012 Planned	0	0.0%	22	95.7%	23	100.0%
2013 Planned	0	0.0%	22	95.7%	23	100.0%

1-5b. DOE Order 430.2B Metering Of Water Use

Fiscal Year	Standard Meters		Advanced Meters		Appropriate Buildings	
	Cumulative # of Buildings Metered	Cumulative % of Water Metered	Cumulative # of Buildings Metered	Cumulative % of Water Metered	# of Appropriate Buildings for Metering	Cumulative % of Buildings Metered
2010 Report	21	40.9%	8	59.1%	29	100.0%
2011 Planned	21	40.9%	8	59.1%	29	100.0%
2012 Planned	21	51.2%	5	48.8%	26	100.0%
2013 Planned	21	51.2%	5	48.8%	26	100.0%

1-5c. EISA 2007 Metering Of Natural Gas Use

Fiscal Year	Standard Meters		Advanced Meters		Appropriate Buildings	
	Cumulative # of Buildings Metered	Cumulative % of Natural Gas Metered	Cumulative # of Buildings Metered	Cumulative % of Natural Gas Metered	# of Appropriate Buildings for Metering	Cumulative % of Buildings Metered
2010 Report	2	1.4%	14	98.6%	16	100.0%
2011 Planned	2	1.4%	14	98.6%	16	100.0%
2012 Planned	2	2.2%	11	97.8%	13	100.0%
2013 Planned	2	2.2%	11	97.8%	13	100.0%

1-5d. EISA 2007 Metering Of Steam Use

Fiscal Year	Standard Meters		Advanced Meters		Appropriate Buildings	
	Cumulative # of Buildings Metered	Cumulative % of Steam Metered	Cumulative # of Buildings Metered	Cumulative % of Steam Metered	# of Appropriate Buildings for Metering	Cumulative % of Buildings Metered
2010 Report	0	0.0%	0	0.0%	0	#DIV/0!
2011 Planned	0	0.0%	0	0.0%	0	#DIV/0!
2012 Planned	0	0.0%	0	0.0%	0	#DIV/0!
2013 Planned	0	0.0%	0	0.0%	0	#DIV/0!

Source Energy Savings Credit

Requirement(s): EO 13123

Instructions: Optional, complete the tables below for projects that increase site energy use but save source energy. For additional guidance see: http://www.eere.energy.gov/femp/pdfs/sec502e_%20guidance.pdf. Edited and new data cells should be highlighted in light blue.

Source: Site/Lab

EPACT Goal Subject Buildings

Name of Project Saving Source Energy in FY 2010 (insert additional rows as necessary)	Annual Site Energy Increase with the Project	Annual Source Energy Saved with the Project	Adjustment to Annual Site Energy
	(10 ⁶ BTU/Yr)	(10 ⁶ BTU/Yr)	(10 ⁶ BTU/Yr)
Project No. 1	0.0	0.0	0.0
Project No. 2	0.0	0.0	0.0
Project No. 3	0.0	0.0	0.0
Totals	0.0	0.0	0.0

EPACT Excluded Buildings

Name of Project Saving Source Energy in FY 2010 (insert additional rows as necessary)	Annual Site Energy Increase with the Project	Annual Source Energy Saved with the Project	Adjustment to Annual Site Energy
	(10 ⁶ BTU/Yr)	(10 ⁶ BTU/Yr)	(10 ⁶ BTU/Yr)
Project No. 1	0.0	0.0	0.0
Project No. 2	0.0	0.0	0.0
Project No. 3	0.0	0.0	0.0
Totals	0.0	0.0	0.0

Conservation and Renewable Energy Measures List

Requirement(s): DOE Order 430.2B, EISA 2007

Instructions: Update the list of conservations and renewable energy measures/projects in the table below and complete all new data fields, if applicable. The new data fields are for GHG emission calculations. For additional guidance see Appendix A of the Site Sustainability Plan Guidance and comments in row 9/10 for each column. On-site operational renewable energy should be listed in the "Operating On-Site Renewables" worksheet. Newly proposed or potential fleet measures should be listed in the "Fleet Measures" worksheet. Edited and new data cells should be highlighted in light blue.

Source: Site/Lab June 2010 EISA Sec 432 report

Key:	
Light Green	Pre-populated data by FEMP to be reviewed and edited.
Orange	Data field in need of review or completion (if applicable) by site.
Yellow	Optional data field to be completed, if applicable and available.

FEMP Measure #	Measure/Project Description										Funding Overview					
	Has this measure been entered in your IPI Crosscut?	IFI Project # (Necessary, if applicable)	Site Project # (Optional)	Conservation Measure(s) Status (Necessary)	Conservation Measure(s) Type (Necessary)	Conservation Measure(s) Name or Description	Measure(s) Location (FMS Property Sequence No., if applicable)	Measure(s) Location (Zip Code)	Does the measure contribute to the reduction of deferred maintenance?	Does the measure contribute to HPSB requirements?	Funding Source/Type (Actual or Potential)	Percent of funds obligated (if applicable and for measures not yet operational) (%)	Starting Year of Measure Implementation (Anticipated or Actual - YYYY)	Measure Completion Year (Anticipated or Actual - YYYY)	Estimated Service Life	Estimated Implementation Cost (\$)
SC-0335-0002				Operational	Electric Motors and Drives	300 area VFD projects		99352			M&R Indirect	100%		2008	25	\$118,793
SC-0335-0003				Operational	Lighting Improvements	Sigma 2,3,4 lighting retrofits		99352			M&R Indirect	100%		2008	25	\$71,620
SC-0335-0004				Operational	Electric Motors and Drives	331 exhaust fan VFD & double filtered exhaust		99352			M&R Indirect	100%		2009	25	\$509,745
SC-0335-0005				Operational	Lighting Improvements	ISB 1&2 lighting retrofits		99352			M&R Indirect	100%		2009	25	\$443,131
SC-0335-0006				Operational	Lighting Improvements	331 Mech rms lighting retrofit		99352			M&R Indirect	100%	2008	2009	25	\$10,720
SC-0335-0007				Operational	Water and Sewer Conservation Systems	325 water conservation project		99352			M&R Indirect	100%	2009	2009	25	\$90,000
SC-0335-0008				Operational	Building Automation Systems/EMCS	SIGMA 2 & 4 Metasys Controls		99352			M&R Indirect	100%	2009	2009	25	\$7,000
SC-0335-0009				Awarded/ Approved	Water and Sewer Conservation Systems	Urinal retrofits - 15 bldgs		99352			M&R Indirect	100%	2010	2011	25	\$186,000
SC-0335-0010				Awarded/ Approved	Water and Sewer Conservation Systems	331 bldg - irrigation retrofit		99352			Other	100%	2010	2011	25	\$300,000
SC-0335-0011				Awarded/ Approved	Advanced Metering Systems	Advanced Metering - 300A & Leased		99352			M&R Indirect	100%		2011	25	\$250,000
SC-0335-0012				Awarded/ Approved	Lighting Improvements	EMSL Occupancy Sensors	131274	99352			M&R Indirect	100%		2011	10	\$12,000
SC-0335-0013				Awarded/ Approved	Building Automation Systems/EMCS	EMSL Temperature Sensors	131274	99352			M&R Indirect	100%	2009	2011	10	\$9,000
SC-0335-0014				Operational	Other	LSB Electrical Car Charging Station		99352			M&R Indirect	100%	2009	2010	25	\$50,000
SC-0335-0015				Operational	Advanced Metering Systems	300 Area Water Meters		99352			M&R Indirect	100%	2010	2011	25	\$200,000
SC-0335-0016				Operational	Heating, Ventilating, and Air Conditioning (HVAC)	EMSL IDEC Pump Replacement & VFD	131274	99352			Other	100%	2010	2010		\$135,000
SC-0335-0017				Operational	Windows	325 Window Replacement		99352			Other	100%	2010	2010	25	\$36,000
SC-0335-0018				Awarded/ Approved	Solar Photovoltaic	EMSL PV Array	131274	99352			Other	100%		2011	40	\$1,200,000
SC-0335-0019				Verified	Heating, Ventilating, and Air Conditioning (HVAC)	331 Heat Reclaim System		99352			UESC	0%	2011	2013	25	\$1,938,000
SC-0335-0020				Operational	Lighting Improvements	300 Area and EMSL LED Parking Lot and Ext. Lighting		99352			Other	100%	2010	2010	25	\$839,000
SC-0335-0021				Verified	Chilled Water/Hot Water/Steam Distribution Systems	300 Area Balancing Valves		99352			M&R Indirect	0%		2011	25	\$20,000
SC-0335-0022				Identified	Lighting Improvements	All building - desk lamp lighting		99352	No		M&R Indirect	0%		2011	10	\$10,000
SC-0335-0023				Operational	Appliance/Plug-load reductions	All Building - Isolate Occupancy Power Strips		99352			M&R Indirect	100%		2010	5	\$10,000
SC-0335-0024				Awarded/Approved	Advanced Metering Systems	EMSL Chilled Water Meter	131274	99352	No		M&R Indirect	0%	2010	2011	25	\$20,000
SC-0335-0025				Verified	Chiller Plant Improvements	Install EMSL weather station to control cooling tower setpoint	131274	99352	No		M&R Indirect	0%	2010	2011	10	\$15,000
SC-0335-0026				Verified	Heating, Ventilating, and Air Conditioning (HVAC)	331 HVAC/Water Reduction Upgrades		99352	Yes		UESC	0%	2011	2013	20	\$5,000,000
SC-0335-0027				Operational	Building Envelope Modifications	ISB 1 Roof Insulation addition during reroof		99352			M&R Indirect	0%		2010	25	\$20,000
SC-0335-0028				Identified	Other	350 - Identify compressed air leaks and fix		99352	Yes		M&R Indirect	0%		2011	5	\$50,000
SC-0335-0029				Identified	Electric Motors and Drives	300 Area Premium Efficient Motors		99352			M&R Indirect	0%		2011	25	\$32,420
SC-0335-0030				Identified	Heating, Ventilating, and Air Conditioning (HVAC)	EMSL CO2 Sensors	131274	99352	No		M&R Indirect	0%		2011	25	\$66,000
SC-0335-0031				Identified	Building Automation Systems/EMCS	ETB Control System Upgrade		99352			M&R Indirect	0%		2011	25	\$300,000
SC-0335-0032				Identified	Lighting Improvements	NSB Lighting Replacement		99352			M&R Indirect	0%		2014	25	\$450,000
SC-0335-0033				Identified	Building Automation Systems/EMCS	ISB1 Control System Upgrade		99352			M&R Indirect	0%		2011	25	\$150,000
SC-0335-0034				Identified	Building Envelope Modifications	ISB 2 Roof Insulation addition during reroof		99352			M&R Indirect	0%		2012	25	\$20,000
SC-0335-0035				Identified	Data Center Efficiency	ETB Computer Room Economizer		99352			M&R Indirect	0%		2012	25	\$50,000
SC-0335-0036				Identified	Data Center Efficiency	ISB2 Computer Room Economizer		99352			M&R Indirect	0%		2012	25	\$50,000
SC-0335-0037				Identified	Building Automation Systems/EMCS	ISB2 Control System Upgrade		99352			M&R Indirect	0%		2012	25	\$150,000
SC-0335-0038				Identified	Data Center Efficiency	LSB Computer Room Economizer		99352			M&R Indirect	0%		2012	25	\$50,000
SC-0335-0039				Identified	Building Automation Systems/EMCS	LSB Control System Upgrade & Economizer Upgrade		99352			M&R Indirect	0%		2013	25	\$250,000
SC-0335-0040				Identified	Energy Related Process Improvements	CA leak fixes at EMSL		99352	Yes		M&R Indirect	0%		2014	5	\$50,000
SC-0335-0041				Identified	Energy Related Process Improvements	CA leak fixes in balance of 300 Area		99352	Yes		M&R Indirect	0%		2014	5	\$100,000
SC-0335-0042				Identified	Building Automation Systems/EMCS	NSB Control System Upgrade		99352			M&R Indirect	0%		2014	25	\$300,000
SC-0335-0043				Identified	Other	Replace Air Compressors at 318, 331, and 350		99352			M&R Indirect	0%		2014	25	\$220,000

Sustainability Metrics I - Energy and Water													
Estimated Annual Energy Savings (10^6 BTU/Yr)	Estimated Annual Energy Cost Savings (\$/Yr)	For measures that increase energy efficiency, provide the percent of energy saved for each energy type. The sum of all savings should equal to 100 percent. This information is needed to calculate GHG emissions mitigated.							Estimated Annual Potable Water Savings (10^3 Gal/Yr)	Estimated Annual ILA Non-Potable Freshwater Savings (10^3 Gal/Yr)	Estimated Annual Water Cost Savings (\$/Yr)	Estimated Annual Ancillary Cost Savings (\$/Yr)	Estimated Annual Cost Savings (\$/Yr)
		Estimated Annual Electricity Saved (%)	Estimated Annual Fuel Oil Saved (%)	Estimated Annual Natural Gas Saved (%)	Estimated Annual LPG/Propane Saved (%)	Estimated Annual Coal Saved (%)	Estimated Annual Steam Saved (%)	Estimated Annual Other BTUs Saved (%)					
1,980	\$34,800	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$34,800
378	\$5,540	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$5,540
1,196	\$21,024	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$21,024
997	\$14,600	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$14,600
128	\$2,250	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$2,250
0	\$0	0%	0%	0%	0%	0%	0%	0%	900	0	\$4,100	\$0	\$4,100
60	\$875	100%	0%	0%	0%	0%	0%	0%	0	0		\$0	\$875
0	\$0	0%	0%	0%	0%	0%	0%	0%	960	0	\$3,500	\$0	\$3,500
0	\$0	0%	0%	0%	0%	0%	0%	0%	5,475	0	\$19,245	\$0	\$19,245
2,129	\$34,315	80%	0%	20%	0%	0%	0%	0%	0	0	\$0	\$0	\$34,315
123	\$1,512	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$1,512
113	\$1,130	69%	0%	31%	0%	0%	0%	0%	0	0	\$0	\$0	\$1,130
0	\$0	0%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$0
0	\$0	0%	0%	0%	0%	0%	0%	0%	???	0	???	\$0	\$0
700	\$6,840	0%	0%	100%	0%	0%	0%	0%	0	0	\$0	\$0	\$6,840
20	\$270	0%	0%	100%	0%	0%	0%	0%	0	0	\$0	\$0	\$270
0	\$0	0%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$9,000
5,528	\$66,341	5%	0%	95%	0%	0%	0%	0%	0	0	\$0	\$0	\$66,341
1,336	\$23,484	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$23,484
156	\$2,256	40%	0%	60%	0%	0%	0%	0%	0	0	\$0	\$0	\$2,256
152	\$2,400	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$2,400
149	\$2,409	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$2,409
0	\$0	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$0
747	\$12,000	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$12,000
18,085	\$251,298	15%	0%	0%	85%	0%	0%	0%	9,980	0	\$46,000	\$160,000	\$457,298
61	\$900	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$900
138	\$2,430	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$2,430
162	\$2,850	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$2,850
515	\$5,940	50%	0%	50%	0%	0%	0%	0%	0	0	\$0	\$0	\$5,940
1,024	\$15,000	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$15,000
998	\$14,625	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$14,625
369	\$5,400	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$5,400
61	\$900	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$900
323	\$4,725	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$4,725
645	\$9,450	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$9,450
369	\$5,400	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$5,400
381	\$5,500	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$5,500
1,185	\$17,360	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$17,360
525	\$6,460	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$6,460
1,050	\$18,456	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$18,456
887	\$13,000	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$13,000
800	\$14,070	100%	0%	0%	0%	0%	0%	0%	0	0	\$0	\$0	\$14,070

Sustainability Metrics II - Renewables											Return on Investment				Notes			
Estimated Annual Renewable Electricity Consumed (kWh/Yr)	Estimated Annual Renewable Electricity Output (kWh/Yr)	Estimated Annual Renewable Thermal Consumed (10^6 BTU/Yr)	Estimated Annual Renewable Thermal Output (10^6 BTU/Yr)	For measures that switch from a fossil fuel to a renewable source, provide the percent of energy saved for each energy type. The sum of all savings should equal to 100 percent. This information is needed to calculate GHG emissions mitigated.							Estimated Annual Cost Savings (\$/Yr) from switching to a renewable energy source	Have you performed a Life-Cycle Cost Analysis? If so, what is the...				Site Priority	Additional Information (Optional)	
				Estimated Annual Electricity Saved (%)	Estimated Annual Fuel Oil Saved (%)	Estimated Annual Natural Gas Saved (%)	Estimated Annual LPG/Propane Saved (%)	Estimated Annual Coal Saved (%)	Estimated Annual Steam Saved (%)	Estimated Annual Other BTUs Saved (%)		Simple Payback	Internal Rate of Return	Net Present Value	Savings-to-Investment Ratio			
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	3.4				
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	12.9				
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	24.2				
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	30.4				
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	4.8				
				0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	22.0				
				100%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	8.0				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	53.1				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	15.6				Funding: "Other" = ARRA, Project ran into technical difficulties from unknown underground conditions, project is being rescope, and will probably use other funding
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	7.3				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	7.9				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	8.0				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!				Fleet Goal
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!				Establish actual 300 Area consumption
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	19.7				Funding: "Other" = ARRA
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	133.3				Impacts excluded facilities. Funding: "Other" = ARRA
200,000	200,000	0	0	100%	0%	0%	0%	0%	0%	0%	0%	0%	\$9,000	133.3				100 kW PV array Funding: "Other" = ARRA
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	29.2				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	35.7				Funding: "Other" = ARRA
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	8.9				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	4.2				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	4.2				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!				Purpose of the meter is to measure how much chilled water is consumed by the supercomputers at EMSL, to develop more accurate PUE metrics, and to possibly exclude only the supercomputer portion of EMSL and not the whole building.
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	1.3				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	10.9				2 We are beginning to work on cost estimates and analyze energy savings from computer modeling
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	22.2				Added cool roof when building scheduled to be reroofed
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	20.6				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	11.4				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	11.1				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	20.0				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	30.8				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	27.8				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	22.2				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	10.6				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	5.3				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	27.8				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	9.1				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	14.4				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	7.7				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	5.4				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	23.1				
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	0%	0%	\$0	15.6				

Conservation and Renewable Energy Measures List

Key:	
Light Green	Pre-populated data by FEMP to be reviewed and edited.
Orange	Data field in need of review or completion (if applicable) by site.
Yellow	Optional data field to be completed, if applicable and available.

Requirement(s): DOE Order 430.2B, EISA 2007

Instructions: Update the list of conservations and renewable energy measures/projects in the table below and complete all new data fields, if applicable. The new data fields are for GHG emission calculations. For additional guidance see Appendix A of the Site Sustainability Plan Guidance and comments in row 9/10 for each column. On-site operational renewable energy should be listed in the "Operating On-Site Renewables" worksheet. Newly proposed or potential fleet measures should be listed in the "Fleet Measures" worksheet. Edited and new data cells should be highlighted in light blue.

Source: Site/Lab June 2010 EISA Sec 432 report

FEMP Measure #	Measure/Project Description										Funding Overview					
	Has this measure been entered in your IPI Crosscut?	IFI Project # (Necessary, if applicable)	Site Project # (Optional)	Conservation Measure(s) Status (Necessary)	Conservation Measure(s) Type (Necessary)	Conservation Measure(s) Name or Description	Measure(s) Location (FMS Property Sequence No., if applicable)	Measure(s) Location (Zip Code)	Does the measure contribute to the reduction of deferred maintenance?	Does the measure contribute to HPSB requirements?	Funding Source/Type (Actual or Potential)	Percent of funds obligated (if applicable and for measures not yet operational) (%)	Starting Year of Measure Implementation (Anticipated or Actual - YYYY)	Measure Completion Year (Anticipated or Actual - YYYY)	Estimated Service Life	Estimated Implementation Cost (\$)
SC-0335-0044				Identified	Building Envelope Modifications	325 Building Envelope Sealing		99352			M&R Indirect	0%	2013	25	\$100,000	
SC-0335-0045				Awarded/Approved	Commissioning, Re/Retro-commissioning	Retro-Commissioning EMSL	131274	99352			M&R Indirect	0%	2010	25	\$337,500	
SC-0335-0046				Awarded/Approved	Commissioning, Re/Retro-commissioning	Retro-Commissioning 1/3 of Leased Facilities	Multiple (33 bldgs)	99352			M&R Indirect	0%	2010	25	\$325,000	
SC-0335-0047				Identified	Commissioning, Re/Retro-commissioning	Retro-Commissioning 2nd 1/3 of Leased Facilities	Multiple (33 bldgs)	99352			M&R Indirect	0%	2011	25	\$325,000	
SC-0335-0048				Identified	Geothermal	PSF GSHP Design and Drill some wells		99352	No		UESC	0%	2012	25	\$1,200,000	
SC-0335-0049				Identified	Geothermal	PSF GSHP Drill remaining wells and add piping system		99352	No		UESC	0%	2013	25	\$2,530,000	
SC-0335-0050				Identified	Geothermal	PSF GSHP final tie in		99352	No		UESC	0%	2014	25	\$270,000	
SC-0335-0051				Identified	Commissioning, Re/Retro-commissioning	Retro-Commissioning last 1/3 of Leased Facilities	Multiple (33 bldgs)	99352			M&R Indirect	0%	2012	25	\$325,000	
SC-0335-0052				Identified	Building Automation Systems/EMCS	SIGMA 5 Control System Upgrade		99352			M&R Indirect	0%	2014	25	\$140,000	
SC-0335-0053				Identified	Heating, Ventilating, and Air Conditioning (HVAC)	Duct Sealing 318, 325, & 331 with Aerogel		99352			UESC	0%	2014	25	\$1,000,000	
SC-0335-0054				Cancelled	Commissioning, Re/Retro-commissioning	300 area retroCx for facilities		99352			Unknown	0%	2009	25	\$174,200	
SC-0335-0055				Cancelled	Energy Related Process Improvements	300 area premium efficient motors		99352			Unknown	0%	2009	25	\$32,420	
SC-0335-0056				Cancelled	Energy Related Process Improvements	350 - identify compressed air leaks and fix		99352			Unknown	0%	2009	25	\$500	
SC-0335-0057				Cancelled	Other	ESPC TEAM Project		99352			ESPC	0%	2009	25	\$5,000,000	
SC-0335-0058				Cancelled	Commissioning, Re/Retro-commissioning	RetroCx 325 facility		99352			Unknown	0%	2010	25	\$144,820	
SC-0335-0059				Cancelled	Commissioning, Re/Retro-commissioning	RetroCx leased facilities		99352			Unknown	0%	2010	25	\$649,017	
SC-0335-0060				Cancelled	Other	Eliminate excess 300 area bldgs		99352			M&R Direct	0%	2011	25		
SC-0335-0061				Cancelled	Commissioning, Re/Retro-commissioning	Planning for 300 Area Retro-Commissioning		99352			Unknown	0%	2009	25	\$25,000	
SC-0335-0062				Cancelled	Commissioning, Re/Retro-commissioning	Retro-Commissioning 331 Facility		99352			Unknown	0%	2010	25	\$189,750	
SC-0335-0063				Cancelled	Other	ECM 2.1 (325 Heat Reclaim/chiller)		99352			Unknown	0%	2010	25	\$1,800,000	
SC-0335-0064				Cancelled	Other	ECM 3.1 (Controls, 331, 325, EMSL)		99352			Unknown	0%	2011	25	\$1,100,000	
SC-0335-0065				Cancelled	Commissioning, Re/Retro-commissioning	Retro-Commissioning 325		99352			Unknown	0%	2011	25	\$225,000	
SC-0335-0066				Cancelled	Other	300 Area Balancing Valves		99352			Unknown	0%	2012	25	\$40,000	
SC-0335-0067				Cancelled	Other	325 Reheat Heat Control		99352			Unknown	0%	2012	25	\$50,000	
SC-0335-0068				Cancelled	Other	325 Room 209/202/203 HVAC		99352			Unknown	0%	2014	25	\$200,000	
SC-0335-0069				Verified	Heating, Ventilating, and Air Conditioning (HVAC)	325 HVAC Upgrades		99352	Yes		UESC	0%	2011	2013	25	\$6,000,000
SC-0335-0070				Cancelled	Heating, Ventilating, and Air Conditioning (HVAC)	HVAC upgrade - 325		99352			Unknown	0%	2010	2012	20	\$7,000,000
SC-0335-0071				Identified	Heating, Ventilating, and Air Conditioning (HVAC)	EMSL waste heat reclaim	131274	99352	No		Unknown	0%	2011	2013	20	\$3,000,000
SC-0335-0072				Identified	Heating, Ventilating, and Air Conditioning (HVAC)	HVAC upgrade - 318		99352	Yes		Unknown	0%	2011	2012	20	\$1,000,000
SC-0335-0073				Identified	Distributed Generation	EMSL infrastructure for fuel cell	131274	99352	No		Unknown	0%	2011	2012	10	\$300,000
SC-0335-0074				Cancelled	Heating, Ventilating, and Air Conditioning (HVAC)	331 VAV		99352			Unknown	0%	2011	2014	25	\$914,000
SC-0335-0075				Identified	Distributed Generation	EMSL fuel cell with combined heating & power	131274	99352	No		Unknown	0%	2011	2012	10	\$4,500,000
SC-0335-0076				Identified	Data Center Efficiency	Install new UPS6, replace old UPS 4 and 5 in ISB2/1		99352			M&R Indirect	0%	2011	2011	15	\$ 300,000
SC-0335-0077				Identified	Data Center Efficiency	Rear-door heat exchanger in CSF for dense racks		99352			M&R Indirect	0%	2012	2015	15	\$ 142,000
SC-0335-0078				Identified	Data Center Efficiency	Ceiling Plenum as hot air return in CSF		99352			Unknown	0%	2011	2013	25	\$ 100,000
SC-0335-0079				Identified	Data Center Efficiency	Rear-door heat exchanger EMSL	131274	99352			Unknown	0%	2012	2013	10	\$250,000
SC-0335-0080				Identified	Data Center Efficiency	Ceiling Plenum as hot air return in EMSL for next Super Computer	131274	99352			Unknown	0%	2012	2013	25	\$250,000
SC-0335-0081				Identified	Data Center Efficiency	240V APC PUD in EMSL for next project and next Super Computer	131274	99352			Unknown	0%	2012	2013	10	\$250,000
SC-0335-0082				Identified	Data Center Efficiency	Hot Aisle air segregation for CSF		99352			Unknown	0%	2011	2012	10	\$100,000
SC-0335-0083				Identified	Data Center Efficiency	Cold aisle air segregation for ISB2/1		99352			Unknown	0%	2012	2013	10	\$50,000
SC-0335-0084				Identified	Computer System Improvements	Desktop power management using BigFix or E1 or other tool for campus		99352			IGPP	0%	2011	2012	10	\$500,000

Sustainability Metrics II - Renewables											Return on Investment				Notes		
Estimated Annual Renewable Electricity Consumed (kWh/Yr)	Estimated Annual Renewable Electricity Output (kWh/Yr)	Estimated Annual Renewable Thermal Consumed (10^6 BTU/Yr)	Estimated Annual Renewable Thermal Output (10^6 BTU/Yr)	For measures that switch from a fossil fuel to a renewable source, provide the percent of energy saved for each energy type. The sum of all savings should equal to 100 percent. This information is needed to calculate GHG emissions mitigated.							Estimated Annual Cost Savings (\$/Yr) from switching to a renewable energy source	Have you performed a Life-Cycle Cost Analysis? If so, what is the...				Site Priority	Additional Information (Optional)
				Estimated Annual Electricity Saved (%)	Estimated Annual Fuel Oil Saved (%)	Estimated Annual Natural Gas Saved (%)	Estimated Annual LPG/Propane Saved (%)	Estimated Annual Coal Saved (%)	Estimated Annual Steam Saved (%)	Estimated Annual Other BTUs Saved (%)		Simple Payback	Internal Rate of Return	Net Present Value	Savings-to-Investment Ratio		
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	22.8					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	11.7					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	8.7					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	8.7					
				100%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!					
				100%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	1.3					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	8.7					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	26.2					
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	12.1					
												2.8					
												17.1					
												0.2					
												#DIV/0!					
												#DIV/0!					
												#DIV/0!					
												#DIV/0!					
												#DIV/0!					
												7.3					
												18.1					
												7.1					
												8.0					
												8.0				This will be done by the 325 HVAC Upgrade Project	
												8.0				This is redundant to row 39 above	
												12.5				This will be done by the 325 HVAC Upgrade Project	
												12.5				This will be done by the 325 HVAC Upgrade Project	
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	6.6			1	We are still working on cost estimates and refining energy savings	
				18%	0%	0%	82%	0%	0%	0%		41.2				Impacts excluded facilities.	
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	14.2			4		
0	0	0	0	0%	0%	0%	0%	0%	0%	0%	\$0	17.2			5	We are beginning to work on cost estimates and analyze energy savings from computer modeling Impacts excluded facilities.	
				100%	0%	0%	0%	0%	0%	0%	\$0	#DIV/0!			3	Infrastructure modifications need to be completed during next scheduled whole building outage (March 2011) so that fuel cell project below can be integrated into building systems. Impacts excluded facilities.	
												12.4				This will be done by the 331 HVAC/Water Reduction Upgrades	
				100%	0%	0%	0%	0%	0%	0%	\$35,000	128.6			3	Demonstration of fuel cell technology in a supercomputer facility. May be able to partner with local biofuel provider to use biofuel waste product as source for fuel cell hydrogen. This would then be an onsite renewable electricity source.	
												71.3				UPS 4 and 5 have to be replaced anyway	
												6.5					
												9.7					
												3.8					
												3.8					
												3.8					
												9.7					
												10.0					
												4.1					

List of Existing Buildings to Meet 15% HPSB Goal

Requirements: DOE Order 430.2B, E.O. 13423

Instructions: Update the list of existing building meeting or planned to meet the HPSB goal in the table below. For additional guidance see Appendix A of the Site Sustainability Plan Guidance and comments in row 9 for each column. Edited and new data cells should be highlighted in light blue.

Source: Site-Lab FY 2009 CEDR

Key:	
Light Green	Pre-populated data by FEMP to be reviewed and edited.
Change	Data field in need of review or completion (if applicable) by site.
Yellow	Optional data field to be completed, if applicable and available.

Basic Information				Guiding Principle Compliance Path							LEED® Compliance Path							
Building Name	FIMS Property Sequence No.	Square Footage	Compliance Path	Assessment Date (Planned or Actual) (MM/DD/YY)	Currently meets Integrated Design GP?	Currently meets Energy Performance GP?	Currently meets Water GP?	Currently meets Indoor Environmental Quality GP?	Currently meets Materials GP?	Planned or actual compliance FY for all 5 Guiding Principles (YY YY)	CD Level on 10/1/08	USGBC Project Title	Planned or Actual Registration Date (MM/DD/YY)	Planned or Actual Certification Date (MM/DD/YY)	Planned or Actual LEED® EDITION Certification Level	LEED EBOM Version	Planned or Actual LEED NC Level	Planned or Actual LEED NC Certification Date (MM/DD/YY)
Radiochemical Calibration Lab	117346	37,025	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
Office Trailer	117400	3,669	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
Analysis & Nuclear Research Lab	117547	31,427	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Radiochemical Processing Lab	117220	144,673	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
Materials Sciences Lab	117321	65,338	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Chemical Sciences Lab	117349	39,420	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Life Sciences Lab	117295	115,127	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
Interim Waste Storage & Disposal	117277	5,116	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Biomagnetics Effects Lab	117278	1,280	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
EHG Integration Laboratory	117328	1,200	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Aerosol Wind Tunnel Res. Fac.	117281	3,557	Guiding Principles	06/30/2011											Select from List	Select from List	Select from List	
Plant Operations & Maintenance	117301	22,048	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
Paint Shop	117302	1,400	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Warehouse	117303	2,122	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Storage Building	117314	212	Guiding Principles	09/30/2010											Select from List	Select from List	Select from List	
Oil Storage Facility	117345	960	Guiding Principles	09/30/2010											Select from List	Select from List	Select from List	
ERTB Equipment Shelter		384	Guiding Principles	09/30/2010											Select from List	Select from List	Select from List	
William R. Wiley - EMSL	117174	224,465	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Met	Met						Select from List	Select from List	Select from List	
100 Area Emergency Rad Detect	140446	96	Guiding Principles	03/31/2012											Select from List	Select from List	Select from List	
300 Area Emergency Rad Detect	140447	96	Guiding Principles	03/31/2012											Select from List	Select from List	Select from List	
Elevator Control Bldg.	117636	170	Guiding Principles	03/31/2012											Select from List	Select from List	Select from List	
Pilot Balloon Release Bldg	117637	144	Guiding Principles	03/31/2012											Select from List	Select from List	Select from List	
Storage Building	117638	1,170	Guiding Principles	D&D Scheduled											Select from List	Select from List	Select from List	
Meteorology Lab	117683	8,960	Guiding Principles	03/31/2012											Select from List	Select from List	Select from List	
Custom Security Initiative 1	205909	793	Guiding Principles	12/31/2011											Select from List	Select from List	Select from List	
2400 Stevens Office Lab Building	139808	101,628	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Environm Warehouse	207039	7,702	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Whole Body Counter Bldg & Office	139805	5,252	Guiding Principles	09/30/2009	Not Yet Met	Not Yet Met	Not Yet Met	Not Yet Met	Not Yet Met						Select from List	Select from List	Select from List	
Applied Process Engineering Lab	142813	52,517	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Albuquerque NM Office	142911	6,617	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Budget Mountain Repeater Bldg	203769	100	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Bioproducts Science & Engneer	205031	30,000	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Biological Sciences Facility	207160	78,218	LEED®								2010	Lease - Construct	Battelle BCSF	03/10/2008	03/31/2010	2.2	LEED® Gold	03/31/2010
Battelle Seattle Office	200709	20,725	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Battelle Washington Office	142814	11,097	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Computational Sciences Facility	207161	65,861	LEED®								2010	Lease - Construct	Battelle BCSF	03/10/2008	03/31/2010	2.2	LEED® Gold	03/31/2010
Environmental Technology Bldg	139809	100,358	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Information Sciences Building	139810	50,200	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Information Sciences Building	139811	60,080	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Joint Global Change Research Initiative	206372	18,043	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Laboratory Support Building	143718	83,921	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Microproducts Breakthrough Initiative	205866	2,140	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
MSL Modular Office	202591	9,688	Guiding Principles	09/30/2009	Not Yet Met	Not Yet Met	Not Yet Met	Not Yet Met	Not Yet Met						Select from List	Select from List	Select from List	
Part of Skamania	142912	2,620	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
National Security Building	136003	100,358	Guiding Principles	09/30/2009											Select from List	Select from List	Select from List	
Pasco Airport Hangar	142815	10,000	Guiding Principles	12/31/2010											Select from List	Select from List	Select from List	
Portland Office	142816	6,395	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Research Support Warehouse	204732	8,000	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Rail Test Center	205241	4,400	Guiding Principles	Not Worthy											Select from List	Select from List	Select from List	
Salk Building	203459	9,905	Guiding Principles	09/30/2009	Not Yet Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Sigma 2 Office Building	139814	20,100	Guiding Principles	09/30/2009	Met	Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Sigma 3 Office Building	117856	20,090	Guiding Principles	09/30/2009	Met	Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Sigma 4 Office Building	202447	20,530	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Sigma 5 Office Lab Building	117858	47,900	Guiding Principles	09/30/2009	Met	Not Yet Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
User Housing Facility	148007	29,108	Guiding Principles	09/30/2009	Met	Met	Not Yet Met	Not Yet Met	Met						Select from List	Select from List	Select from List	
Material Sciences and Technology Lab		79,878	LEED®								2012	CD-3B	PNNL Physical S	01/22/2007	12/31/2011	2.2	LEED® Certified	12/31/2011
Radiation Detection Lab		81,366	LEED®								2012	CD-3B	PNNL Physical S	01/22/2007	12/31/2011	2.2	LEED® Certified	12/31/2011
Ultra Trace Lab		70,296	LEED®								2012	CD-3B	PNNL Physical S	01/22/2007	12/31/2011	2.2	LEED® Certified	12/31/2011
Ultra-Low Background Counting Lab		7,418	LEED®								2012	CD-3B	PNNL Physical S	01/22/2007	12/31/2011	2.2	LEED® Certified	12/31/2011
Large Detector Lab		5,488	LEED®								2012	CD-3B	PNNL Physical S	01/22/2007	12/31/2011	2.2	LEED® Certified	12/31/2011

Appendix B – FIMS

**U.S. Department of Energy
Facilities Information Management System
Building Energy Consuming Report**

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	001	DOE-EM Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
212	747A	Whole Body Counter Bldg & Office Trailer	Building	Contractor Lease	3,232	0	0	Electricity	335
400	622C	Storage Building	Building	DOE Owned	1,170	0	0	None	335
401	331D	Biomagnetic Effects Lab	Building	DOE Owned	1,280	0	0	None	335
410	331C	Interim Waste Storage & Disposal	Building	DOE Owned	5,116	0	0	None	335
694	622A	Elevator Control Bldg	Building	DOE Owned	170	0	0	None	335
694	622B	Pilot Balloon Release Bldg	Building	DOE Owned	144	0	0	None	335
741	331H	Aerosol Wind Tunnel Res Fac	Building	DOE Owned	3,557	0	0	Electricity	335
759	326	Materials Sciences Lab	Building	DOE Owned	63,334	0	0	Electricity Gas Remote	335
761	622R	Meteorology Lab	Building	DOE Owned	8,960	0	0	None	335
791	320	Analysis & Nuclear Research Lab	Building	DOE Owned	31,427	0	0	Electricity Gas Remote	335
791	329	Chemical Sciences Lab	Building	DOE Owned	39,420	0	0	Electricity Gas Remote	335

**U.S. Department of Energy
Facilities Information Management System
Building Energy Consuming Report**

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	001	DOE-EM Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
791	331G	331G Integration Laboratory	Building	DOE Owned	1,200	0	0	None	335
801	6221NA	100 Area Emergency Rad Detect Sys Bldg	Building	DOE Owned	96	0	0	None	335
801	6223A	300 Area Emergency Rad Detect Sys Bldg	Building	DOE Owned	96	0	0	None	335
Area Totals					159,202	0	0		
101	BSRC	Battelle Seattle Office	Building	Contractor Lease	0	0	20,725	None	335
101	BURLINGTON	Burlington, MA - Office Building	Building	Contractor Lease	0	0	566	None	335
101	BWO	Battelle Washington Office	Building	Contractor Lease	0	0	11,097	None	335
101	CSI1	Coastal Security Institute 1	Building	DOE Owned	0	0	700	None	335
101	ETB	Environmental Technology Building	Building	Contractor Lease	100,358	0	0	Electricity	335
101	JGCRI	Joint Global Change Research Institute	Building	Contractor Lease	0	0	18,043	None	335
101	LSB	Laboratory Support Building	Building	Contractor Lease	83,245	676	0	Electricity	335

**U.S. Department of Energy
Facilities Information Management System
Building Energy Consuming Report**

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	002	DOE-SC Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
101	MSL7	Marine Sciences Laboratory 7	Building	Contractor Lease	0	0	9,688	None	335
101	PORTLAND	Portland Office	Building	Contractor Lease	0	0	6,395	None	335
101	POS2	Port of Skamania Office Building	Building	Contractor Lease	0	0	3,150	None	335
101	SIGMA1	Sigma 1 Office Building	Building	Contractor Lease	0	20,000	0	Electricity	335
101	SIGMA2	Sigma 2 Office Building	Building	Contractor Lease	20,100	0	0	Electricity	335
101	SIGMA3	Sigma 3 Office Building	Building	Contractor Lease	20,090	0	0	Electricity	335
101	SIGMA4	Sigma 4 Office Building	Building	Contractor Lease	20,530	0	0	Electricity	335
296	APLEGATE	Albuquerque NM Office	Building	Contractor Lease	0	0	6,617	None	335
296	NSB	National Security Building	Building	Contractor Lease	100,358	0	0	Electricity	335
301	UHF	User Housing Facility	Building	Contractor Lease	29,108	0	0	Electricity Gas	335
400	350C	Storage Building	Building	DOE Owned	212	0	0	None	335

**U.S. Department of Energy
Facilities Information Management System
Building Energy Consuming Report**

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	002	DOE-SC Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
400	RSW	Research Support Warehouse	Building	Contractor Lease	0	0	8,000	None	335
401	2770WHSE	Einstein Warehouse	Building	Contractor Lease	0	0	7,702	None	335
401	POS	Port of Skamania Lab-Warehouse Building	Building	Contractor Lease	0	0	2,620	None	335
401	RTC	Rail Test Center	Building	Contractor Lease	0	0	4,400	None	335
410	350D	Oil Storage Facility	Building	DOE Owned	960	0	0	None	335
601	350	Plant Operations & Maintenance Facility	Building	DOE Owned	22,048	0	0	None	335
602	350A	Paint Shop	Building	DOE Owned	1,400	0	0	None	335
604	350B	Warehouse	Building	DOE Owned	2,122	0	0	None	335
681	POP	Port of Pasco Airport Hanger	Building	Contractor Lease	10,000	0	0	Electricity Gas	335
694	BADGERMTN	Badger Mountain Repeater Building	Building	Contractor Lease	0	0	100	None	335
702	CSF	Computational Sciences Facility	Building	Contractor Lease	65,861	0	0	Electricity Gas	335

**U.S. Department of Energy
Facilities Information Management System
Building Energy Consuming Report**

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	002	DOE-SC Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
702	ISB1	Information Sciences Building - 1	Building	Contractor Lease	50,200	0	0	Electricity	335
702	ISB2	Information Sciences Building - 2	Building	Contractor Lease	56,226	3,854	0	Electricity	335
702	SALK	Salk Building	Building	Contractor Lease	9,903	0	0	Electricity	335
704	318	Radiological Calibrations Lab	Building	DOE Owned	37,025	0	0	Electricity Gas Remote	335
711	3410	Material Sciences & Technology Lab	Building	DOE Owned	0	79,878	0	Electricity Gas Remote/G	335
712	325	Radiochemical Processing Laboratory	Building	DOE Owned	144,820	0	0	Electricity Gas Remote	335
721	3430	Ultratrace Laboratory	Building	DOE Owned	0	70,298	0	Electricity Gas Remote/G	335
723	2400STV	2400 Stevens Office/Lab Building	Building	Contractor Lease	101,626	0	0	Electricity	335
723	3020	William R. Wiley - EMSL	Building	DOE Owned	0	224,463	0	Electricity Gas Remote	335
723	3420	Radiation Detection Laboratory	Building	DOE Owned	0	81,369	0	Electricity Gas Remote/G	335
723	3425	Ultra Low Background Counting Laboratory	Building	DOE Owned	0	7,418	0	Electricity Gas Remote/G	335

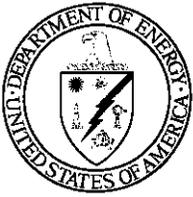
U.S. Department of Energy Facilities Information Management System Building Energy Consuming Report

Field Office	10	Oak Ridge Office
Site	10014	Pacific Northwest National Lab
Area	002	DOE-SC Owned & Contractor Leased

Usage Code	Property Id	Property Name	Building Trailer	Owned Leased Permit	Building/Facilities	Metered Process (Exempt)	Non-Energy Consuming Bldgs/Facilities	Meters	EMS Site
723	3440	Large Detector Laboratory	Building	DOE Owned	0	5,488	0	Electricity Remote/G	335
741	331	Life Sciences Lab	Building	DOE Owned	115,127	0	0	Electricity Gas Remote	335
741	BSEL	Bioproducts Science & Engineering Lab	Building	Contractor Lease	0	0	30,000	None	335
741	BSF	Biological Sciences Facility	Building	Contractor Lease	78,218	0	0	Electricity Gas	335
751	MBI11	Microproducts Breakthrough Institute Bld	Building	Contractor Lease	0	0	3,207	None	335
761	SIGMA5	Sigma 5 Office/Lab Building	Building	Contractor Lease	47,900	0	0	Electricity Gas	335
781	APEL	Applied Process Engineering Laboratory	Building	Contractor Lease	0	0	52,517	None	335

Area Totals	1,117,437	493,444	185,527
Site Totals	1,276,639	493,444	185,527
Field Office Totals	1,276,639	493,444	185,527
Grand Totals	1,276,639	493,444	185,527

Appendix C – Self Certification Form



Department of Energy
Pacific Northwest Site Office
P.O. Box 350, K9-42
Richland, Washington 99352

DEC 14 2010

11-PNSO-0098

MEMORANDUM FOR M. E. JONES, ASSOCIATE DIRECTOR
OFFICE OF SAFETY, SECURITY AND INFRASTRUCTURE
SC-31, HQ

FROM:

MICHAEL J. WEIS
MANAGER

*David Thayer
for*

SUBJECT:

PACIFIC NORTHWEST NATIONAL LABORATORY BUILDING
EXCLUSION SELF-CERTIFICATION FOR FY 2010

In accordance with the Federal Energy Management Program (FEMP) "Guidelines Establishing Criteria for Excluding Buildings," and the FEMP Excluded Buildings Reporting Guidance for FY 2010, dated August 25, 2010, the Pacific Northwest Site Office (PNSO) submits the Annual Self-Certification Form, and additionally PNSO certifies that the buildings on the Excluded Buildings List, FIMS Report 063, meet the criteria in the Guideline Criteria for Parts E, G, and H. Each building eligible to be excluded under the Guideline Criteria is metered for energy consumption and their consumption is reported annually.

Additionally, as required for Part H exclusion, a third-party verification has been completed verifying that the excluded building has undergone a comprehensive energy audit within the last five years and all practicable energy and water conservation measures (with a payback of less than 10 years) have been identified and implemented. This third-party verification was performed by Johnson Controls, Inc., as part of the Energy Savings Performance Contract (ESPC) process. All practical Energy Conservation Measures were included in the ESPC Detailed Energy Survey; subsequently, it was determined that the project was not viable. The Site's Annual Energy Management Report and associated data will be submitted under separate transmittal.

If you have any questions, please contact me, or your staff may contact Joe Escamillo, Operations Division, at (509) 372-4014.

Enclosure

cc w/encl:

C. B. Miller, SC-31.2

S. C. Schell, EE-2L

D. Shen, EE-2L

J. G. Yates, SC-31-2, HQ

DOE BUILDING EXCLUSION SELF-CERTIFICATION FORM

Part A

Name of DOE Site: Pacific Northwest Site Office

Program Office Landlord: (check one)

- Federal Energy Regulatory Administration (FERC)
- Bonneville Power Administration (BPA)
- National Nuclear Security Administration (NNSA)
- Office of Civilian and Radioactive Waste Management (RW)
- Office of Energy Efficiency and Renewable Energy (EE)
- Office of Environmental Management (EM)
- Office of Fossil Energy (FE)
- Office of Legacy Management (LM)
- Office of Management (MA)
- Office of Nuclear Energy (NE)
- Office of Science (SC)
- Southeastern Power Administration (SEPA)
- Southwestern Power Administration (SWPA)
- Western Power Administration (WAPA)
- (other, please specify _____)

Name, Phone Number, and Email address for further information at the site:

Marv Olson – (509) 371-7027 marv.olson@pnl.gov

PART B

- Building or group of buildings is privately owned and privately occupied but happen to be co-located on Federal lands or military installations. (Privately owned buildings listed in FIMS will not be excluded in this Part.)

PART C

- Building or group of buildings has Fully-Serviced Leases.

PART D

- Building or group of buildings is/are essentially structures such as outside parking garages which consume essentially only lighting energy, yet are classified or categorized as buildings.

PART E

- Building or group of buildings has energy usage that is skewed significantly due to reasons such as: buildings entering or leaving the inventory during the year, buildings down-scaled operationally to prepare for decontamination, decommissioning and disposal, and buildings undergoing major renovation and/or major asbestos removal.

PART F

— Building or group of buildings is/are leased space where the Government may pay for some energy but not all, the space comprises only part of a building, or the expiration date of the lease limits the ability to undertake energy conservation measures.

PART G (BOTH statements in this part must be checked for exclusion)

Building or group of buildings is/are separately-metered energy-intensive loads that are driven by mission and operational requirements, not necessarily buildings, and not influenced by conventional building energy conservation measures.

AND

Building or group of buildings is/are metered for energy consumption and their consumption will be reported annually.

PART H (BOTH statements in this part must be checked for exclusion)

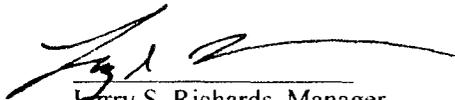
Building or group of buildings can demonstrate four critical findings at the excluded building(s): 1) Energy requirements are impracticable; 2) All Federally required energy management reports have been completed and submitted; 3) Has achieved compliance with all energy efficiency requirements; and 4) Implementation of all practicable, life cycle cost-effective projects.

AND

Building or group of buildings is/are metered for energy consumption and their consumption will be reported annually.

Part I

I certify that the buildings in the attached list meet the exclusion criteria as described above.



Harry S. Richards, Manager
Plant Engineering Technical Services

12/8/10

Date

**U. S. Department of Energy
Facilities Information Management System
Energy Consuming Excluded Buildings and Trailers List**

HQ Program Office		SC				
FIMS Site Name - Number		Pacific Northwest National Lab	10014			
Property ID	Prop Sequence	Property Name	Exclusion Part	Property Type	Gross Sqft	Excluded Sqft
3020	131274	William R. Wiley - EMSL	H - Impracticability	B	224,463	224,463
Justification Comment:	Excluded starting in FY07 because the supercomputer dominates usage in the building.					
3410	207367	Material Sciences & Technology Lab	E - Skewed energy usage	B	79,878	79,878
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					
3420	207846	Radiation Detection Laboratory	E - Skewed energy usage	B	81,369	81,369
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					
3425	207847	Ultra Low Background Counting Laboratory	E - Skewed energy usage	B	7,418	7,418
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					
3430	207369	Ultratrace Laboratory	E - Skewed energy usage	B	70,298	70,298
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					
3440	207848	Large Detector Laboratory	E - Skewed energy usage	B	5,488	5,488
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					
ISB2	139811	Information Sciences Building - 2	G - Metered intensive loads	B	60,080	3,854
Justification Comment:	Excluding the data center located in this building.					
LSB	143718	Laboratory Support Building	G - Metered intensive loads	B	83,921	676
Justification Comment:	Excludes data center located in the building.					
SIGMA1	207218	Sigma 1 Office Building	E - Skewed energy usage	B	20,000	20,000
Justification Comment:	Added to the PNNL portfolio nominally mid-year during FY10. Per Guidance for the FY10 DOE Site Sustainability Plans(8/25/2010), App C-Excluded Buildings Self-Certification, Definitions of Exclusions Allowed Under the Energy Intensity Reduction Goal: Part E-Building "...buildings entering or leaving the inventory during the year...", such buildings should be excluded for their (first) partial year.					

This report qualifies DOE Owned, DOE Leased, and Contractor Leased buildings and trailers (real property and personal property) where the Energy Consuming Metered Process (Excluded) Facilities gsf is greater than zero.

Appendix D – EMS4

Energy Consumption and Cost Report

Site: 335 PACIFIC NORTHWEST NATIONAL
LABORATORY
Quarter 1 - 4

Field Element: SC SCIENCE
Program Office: SC

	Consumption		2010		% Change	Cost		
	2009	2010	Standard Units	BTU x 10 ⁹		2009	2010	% Change
	Standard Units	BTU x 10 ⁹	Standard Units	BTU x 10 ⁹		(x 1000)		
Electricity-MWH	34,559.777	117.918	0.000	0.000	-100.0%	1,981.06	0.000	-100.0%
Fuel Oil-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Natural Gas-(MCF)	62,055.193	63.979	71,116.884	73.321	14.6%	764.204	689.830	-9.73%
LPG-(K Gal)	0.761	0.073	1.194	0.114	56.9%	1.211	1.471	21.47%
Coal-Short Tons	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Steam-(Btu X 10 ⁹)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Other-(Btu X 10 ⁹)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Purch Renew Electric-	7,060.560	24.091	46,132.200	157.403	553.38%	347.782	2,834.500	715.02%
Purch Renew Other-BBtu	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Sq. Ft. (x 1000)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Total :		206.061		230.838	12.02%	3,094.266	3,525.801	13.95%
Square Footage		1,280.692		1,280.308	-0.03%			
Energy/1000 Sqft		160.898		180.299	12.06%			
Subtotal		206.061		230.838	12.02%	3,094.266	3,525.801	13.95%
Total (BTUs)		206.061		230.838	12.02%	3,094.266	3,525.801	13.95%
EXCLUDED								
Electricity-MWH	33,825.990	114.732	25,037.767	85.429	-25.54%	1,317.42	985.691	-25.18%
Fuel Oil-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Natural Gas-(MCF)	13,408.924	13.824	13,321.051	13.734	-0.66%	94.190	118.289	25.59%
LPG-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Coal-Short Tons	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Steam-(Btu X 10 ⁹)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Other-(Btu X 10 ⁹)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Purch Renew Electric-	0.000	0.000	12,010.900	40.981	0.0%	0.000	476.779	0.0%
Purch Renew Other-BBtu	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Sq. Ft. (x 1000)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Total :		128.556		140.144	9.01%	1,411.618	1,580.759	11.98%
Square Footage		228.993		493.444	116.48%			
Energy/1000 Sqft		561.397		284.012	-49.41%			
Subtotal		334.617		370.982	10.87%	4,505.884	5,106.560	13.33%
Total (BTUs)		334.617		370.982	10.87%	4,505.884	5,106.560	13.33%
VEHICLES AND EQUIPMENT								
LPG-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Other-(Btu X 10 ⁹)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Auto Gas-(K Gal)	1.310	0.185	1.280	0.160	-2.29%	3.558	3.848	8.15%

Aviation Gas-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Diesel-(K Gal)	1.700	0.235	1.740	0.241	2.35%	5.610	5.806	3.49%
Jet Fuel-(K Gal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Total :		0.400		0.401	0.25%	9.168	9.654	5.3%
Subtotal		335.017		371.383	10.85%	4,515.052	5,116.214	13.31%
Total (BTUs)		335.017		371.383	10.85%	4,515.052	5,116.214	13.31%

WATER

Potable (Mgal)	101.165	0.000	84.322	0.000	-16.65%	321.644	324.596	0.92%
ILA non-potable fresh	97.522	97.522	97.522	97.522	0.0%	0.000	0.000	0.0%
Re claimed/cycled (Mgal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Aquifer Replenish (Mgal)	0.000	0.000	0.000	0.000	0.0%	0.000	0.000	0.0%
Total :		97.522		97.522	0.0%	321.644	324.596	0.92%
Subtotal		432.539		468.905	8.41%	4,836.696	5,440.810	12.49%
Total (BTUs)		432.539		468.905	8.41%	4,836.696	5,440.810	12.49%

Appendix E – 2008 GHG Baseline Adjustment

2 Scope 1 Fugitive Emissions: Refrigerants and Fluorinated Gases

Must be filled in
Should be filled in
Fill in F-Gas Aquisitions if you only have purchasing records

Data Type Entered Fiscal Year

Material Type:	CAS Number	Composition	Quantity in storage at beginning of inventory year	Unit of Measure	Quantity in storage at end of inventory year	Unit of Measure	Sum of all F-Gas acquisitions	Unit of Measure	Sum of all F-Gas disbursements	Unit of Measure	Total capacity of F-Gas in equipment at beginning of inventory year	Unit of Measure	Total Cacity of all F-Gas in equipment at end of Inventory year	Unit of Measure	F-Gas imported from Refrigerants tab	Unit of Measure	Total quantity emitted by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	GWP by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	
Carbon dioxide	124-38-9	CO2	5307.26	lbs	4,510.9	lbs	1,460.7	lbs	0.0	lbs	0.0	lbs	0.0	lbs			2,257.0	lbs	1.0	MT	1	CO2e	1.0	MT CO2e	
Methane	74-82-8	CH4	418.10	lbs	341.7	lbs	18.1	lbs	0.0	lbs	0.0	lbs	0.0	lbs			94.4	lbs	0.0	MT	21	CO2e	0.9	MT CO2e	
Nitrous oxide	10024-97-2	N2O	164.13	lbs	203.7	lbs	59.5	lbs	0.0	lbs	0.0	lbs	0.0	lbs			19.9	lbs	0.0	MT	310	CO2e	2.8	MT CO2e	
Hydrofluorocarbons (HFCs)																									
HFC-23	75-46-7	CHF3	6.06	lbs	5.6	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.23	lbs	0.7	lbs	0.0	MT	11,700	CO2e	3.9	MT CO2e	
HFC-32	75-10-5	CH2F2	24.25	lbs	24.5	lbs	0.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	650	CO2e	0.0	MT CO2e	
HFC-41	593-53-3	CH3F	0.67	lbs	0.5	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.2	lbs	0.0	MT	150	CO2e	0.0	MT CO2e	
HFC-125	354-33-6	CHF2CF3	20.84	lbs	20.8	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.1	lbs	0.0836	lbs	0.1	lbs	0.0	MT	2,800	CO2e	0.1	MT CO2e	
HFC-134	359-35-3	CHF2CHF2	0.22	lbs	0.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	1,000	CO2e	0.0	MT CO2e	
HFC-134a	811-97-2	CH2FCF3	275.24	lbs	241.6	lbs	13.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	3.7076	lbs	50.5	lbs	0.0	MT	1,300	CO2e	29.8	MT CO2e	
HFC-143	430-66-0	CHF2CH2F	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	300	CO2e	0.0	MT CO2e	
HFC-143a	420-46-2	CF3CH3	0.76	lbs	0.5	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.3	lbs	0.0988	lbs	0.3	lbs	0.0	MT	3,800	CO2e	0.5	MT CO2e	
HFC-152	624-72-6	CH2FCH2F	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	53	CO2e	0.0	MT CO2e	
HFC-152a	75-37-6	CH3CHF2	21.48	lbs	11.9	lbs	3.4	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	13.1	lbs	0.0	MT	140	CO2e	0.8	MT CO2e	
HFC-161	353-36-6	CH3CH2F	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	12	CO2e	0.0	MT CO2e	
HFC-227ca	2252-84-8	CF3CF2CHF2	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	2,900	CO2e	0.0	MT CO2e	
HFC-227ea	431-89-0	CF3CHFCF3	0.27	lbs	0.3	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	2,900	CO2e	0.0	MT CO2e	
HFC-236ca	27070-61-7	CHF2CF2CHF2	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	120	CO2e	0.0	MT CO2e	
HFC-236cb	677-56-5	CH2FCF2CF3	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	1,340	CO2e	0.0	MT CO2e	
HFC-236ea	431-63-0	CHF2CHFCF3	8.08	lbs	10.2	lbs	2.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	1,370	CO2e	0.0	MT CO2e	
HFC-236fa	690-39-1	CF3CH2CF3	1.07	lbs	1.1	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	6,300	CO2e	0.0	MT CO2e	
HFC-245ca	679-86-7	CH2FCF2CHF2	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	560	CO2e	0.0	MT CO2e	
HFC-245fa	460-73-1	CHF2CH2CF3	10.39	lbs	10.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.4	lbs	0.0	MT	1,030	CO2e	0.2	MT CO2e	
HFC-365mfc	406-58-6	CF3CH2CF2CH3	0.20	lbs	0.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	794	CO2e	0.0	MT CO2e	
HFC-c-447ef	15290-77-4	c-C5H3F7	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	250	CO2e	0.0	MT CO2e	
HFC-43-10mee	138495-42-8	CF3CHFCF2CF3	55.98	lbs	55.1	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.9	lbs	0.0	MT	1,300	CO2e	0.5	MT CO2e	
Perfluorocarbons (PFCs)																									
PFC-14	75-73-0	CF4	0.12	lbs	0.1	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.1	lbs	0.0	MT	6,500	CO2e	0.2	MT CO2e	
PFC-116	76-16-4	C2F6 (CF3CF3)	2.57	lbs	2.6	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	9,200	CO2e	0.0	MT CO2e	
PFC-218	76-19-7	C3F8 (CF3CF2CF3)	72.65	lbs	72.7	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	7,000	CO2e	0.0	MT CO2e	
PFC-318 or PFC-c318	115-25-3	c-C4F8 (-CF2)4-	82.77	lbs	82.8	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0	lbs	0.0	lbs	0.0	MT	8,700	CO2e	0.0	MT CO2e	
PFC-3-1-10	355-25-9	C4F10	0.21	lbs	0.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	7,000	CO2e	0.0	MT CO2e	
PFC-4-1-12	678-26-2	C5F12	0.57	lbs	0.2	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.4	lbs	0.0	MT	7,500	CO2e	1.2	MT CO2e	
PFC-5-1-14	355-42-0	C6F14	2.29	lbs	0.6	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			1.7	lbs	0.0	MT	7,400	CO2e	5.8	MT CO2e	
PFC-9-1-18	306-94-5	C10F18	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	7,500	CO2e	0.0	MT CO2e	
Perfluorocyclopropane	931-91-9	c-C3F6	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	17,340	CO2e	0.0	MT CO2e	
Sulfur hexafluoride	2551-62-4	SF6	2317.35	lbs	2,125.3	lbs	15.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			207.0	lbs	0.1	MT	23,900	CO2e	2,244.1	MT CO2e	
Nitrogen Trifluoride	7783-54-2	NF3	53.82	lbs	58.8	lbs	5.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	17,200	CO2e	0.0	MT CO2e	
Other fugitive gases																									
[Enter Fugitive Gas Name]		[Enter Molecular Comp	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e	
[Enter Fugitive Gas Name]		[Enter Molecular Comp	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e	
[Enter Fugitive Gas Name]		[Enter Molecular Comp	0.00	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs	0.0	lbs			0.0	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e	

Total Direct Chemical Usage Fugitive Emissions 2,291.9 MT CO2e 2,291.9 MT CO2e

Source: U.S. EPA Climate Leaders Program, Technical Guidance, Direct HFC and PFC Emissions from Use of Refrigeration and Air Conditioning Equipment, May 2008, see at: <http://www.epa.gov/stateply/documents/resources/mfgrfg.pdf>

Comments:
Chemical Management System records were used to calculate the amount of GHG's in each container in inventory at the start of the year, those purchased during the year, and those in inventory at the end of the year. The inventory includes containers of chemicals and products that have an associated hazard or compliance requirements.

The amounts used during the year were estimated as the inventory at the start + purchases - the inventory at the end. It was assumed that all that was used was emitted.

A portion of the inventory is static and the emissions can not be estimated as described above. It was assumed that portion was used at the same rate as the inventory that was not static. A static inventory is an amount that can be maintained continuously as a working supply at a location, but the rates of use of those materials are not tracked.

Emissions were calculated for any building in which PNNL work is conducted, some of which are not owned by DOE.

3 Scope 1: Industrial Process Emissions By Process

Must be filled in

Process Type	GHG Type	Composition	Total Quantity Emitted by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	GWP by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure
Adipic Acid Production	Nitrous oxide	N2O	0.0	lbs	0.0	MT	310	CO2e	0.0	MT CO2e
Aluminum Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
Aluminum Production	PFC-14	CF4	0.00	lbs	0.0	MT	6,500	CO2e	0.0	MT CO2e
Aluminum Production	PFC-116	C2F6 (CF3CF3)	0.00	lbs	0.0	MT	9,200	CO2e	0.0	MT CO2e
Ammonia Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
Cement Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
HFC-22 Production	HFC-23	CHF3	0.00	lbs	0.0	MT	11,700	CO2e	0.0	MT CO2e
Iron and Steel Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
Lime Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
Nitric Acid Production	Nitrous oxide	N2O	0.00	lbs	0.0	MT	310	CO2e	0.0	MT CO2e
Pulp and Paper Production	Carbon dioxide	CO2	0.00	lbs	0.0	MT	1	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	HFC-23	CHF3	0.00	lbs	0.0	MT	11,700	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	HFC-32	CH2F2	0.00	lbs	0.0	MT	650	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	PFC-14	CF4	0.00	lbs	0.0	MT	6,500	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	PFC-116	C2F6 (CF3CF3)	0.00	lbs	0.0	MT	9,200	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	PFC-218	C3F8 (CF3CF2CF3)	0.00	lbs	0.0	MT	7,900	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	PFC-318 or PFC-c318	c-C4F8 (- (CF2)4 -)	0.00	lbs	0.0	MT	8,700	CO2e	0.0	MT CO2e
Semiconductor Manufacturing	Sulfur hexafluoride	SF6	0.00	lbs	0.0	MT	23,900	CO2e	0.0	MT CO2e
[Enter Process Name]	[Enter GHG Name]	[Enter Molecular Composition]	0.00	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e
[Enter Process Name]	[Enter GHG Name]	[Enter Molecular Composition]	0.00	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e
[Enter Process Name]	[Enter GHG Name]	[Enter Molecular Composition]	0.00	lbs	0.0	MT	0.0	CO2e	0.0	MT CO2e
Total Process Emissions			0.0	MT CO2e					0.0	MT CO2e

Source 1: U.S. EPA, Mandatory Greenhouse Gas Reporting Rule (MRR), Federal Register, October 30, 2009, see at: <http://www.epa.gov/climatechange/emissions/ghgrulemaking.html>.

Source 2: IPCC 2006 Guidelines, Volume 3, Industrial Processes and Product Use, see at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol3.html>

Comments:

PNNL does not operate process units.

5 Scope 3: Employee (Federal and M&O Contractor) Business Ground Travel

Must be filled in
May be filled in

Default Methodology (A)																										
Process Type	Vehicle Type	Fuel Type	Annual number of vehicle rentals	Average Rental Mileage per Trip			Total Mileage by Vehicle Type	Unit of Measure	Emission Factor CO2	Unit of Measure	Emission Factor CH4	Unit of Measure	Emission Factor N2O	Unit of Measure	Total Quantity Emitted CO2	Total Quantity Emitted CH4	Total Quantity Emitted N2O	Unit of Measure	GWP Factor for CO2	GWP Factor for CH4	GWP Factor for N2O	Unit of Measure	Total Quantity Emitted (CO2e)	Unit of Measure	Total Quantity Emitted (CO2e)	Unit of Measure
Ground Business Travel Emissions - Rentals Emissions	Passenger Car	Gasoline	0.0	419.0			0.0	Miles	0.364	kg CO2/Mile	0.000031	kg CH4/Mile	0.000032	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	SUV or Truck	Gasoline	0.0	419.0			0.0	Miles	0.519	kg CO2/Mile	0.000036	kg CH4/Mile	0.000047	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
Personal Vehicle Use	Passenger Car	Gasoline					0.0	Miles	0.364	kg CO2/Mile	0.000031	kg CH4/Mile	0.000032	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	SUV or Truck	Gasoline					0.0	Miles	0.519	kg CO2/Mile	0.000036	kg CH4/Mile	0.000047	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e

Or:

Sub-Total Rental Emissions	0.0	MT CO2e
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Advanced Methodology (B)																										
Process Type	Vehicle Type	Fuel Type	Total Quantity Fuel Purchased	Unit of Measure	Average MPG	Unit of Measure	Total Mileage by Vehicle Type	Unit of Measure	Emission Factor CO2	Unit of Measure	Emission Factor CH4	Unit of Measure	Emission Factor N2O	Unit of Measure	Total Quantity Emitted CO2	Total Quantity Emitted CH4	Total Quantity Emitted N2O	Unit of Measure	GWP Factor for CO2	GWP Factor for CH4	GWP Factor for N2O	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure
Ground Business Travel Emissions - Direct Fuel Purchase Emissions (rental Vehicle used for business purposes)	Passenger Car	Gasoline	52,902.8	Gallons	22.5	Miles / Gallon	1,190,313.8	Miles	0.364	kg CO2/Mile	0.000031	kg CH4/Mile	0.000032	kg N2O/Mile	433,274.2	36.9	38.1	kg	1	21	310	CO2e	445,857.0	kg CO2e	445.9	MT CO2e
	SUV or Truck	Gasoline	0.0	Gallons	16.2	Miles / Gallon	0.0	Miles	0.519	kg CO2/Mile	0.000036	kg CH4/Mile	0.000047	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	SUV or Truck	Diesel	0.0	Gallons	18.1	Miles / Gallon	0.0	Miles	0.561	kg CO2/Mile	0.000001	kg CH4/Mile	0.000015	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
Personal Vehicle Use	Passenger Car	Gasoline					713,259.4	Miles	0.364	kg CO2/Mile	0.000031	kg CH4/Mile	0.000032	kg N2O/Mile	259,626.4	22.1	22.8	kg	1	21	310	CO2e	267,166.3	kg CO2e	267.2	MT CO2e
	SUV or Truck	Gasoline					305,682.6	Miles	0.519	kg CO2/Mile	0.000036	kg CH4/Mile	0.000047	kg N2O/Mile	158,649.3	11.0	14.4	kg	1	21	310	CO2e	163,334.2	kg CO2e	163.3	MT CO2e

Optional but Encouraged:

Sub-Total Rental Direct Fuel Purchase Emissions	713.0	MT CO2e
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Advanced Methodology (C)																										
Process Type	Vehicle Type	Fuel Type	Number of Agency Business Trip	Average Passenger Miles per Trip	Average MPG	Unit of Measure	Total Mileage by Vehicle Type	Unit of Measure	Emission Factor CO2	Unit of Measure	Emission Factor CH4	Unit of Measure	Emission Factor N2O	Unit of Measure	Total Quantity Emitted CO2	Total Quantity Emitted CH4	Total Quantity Emitted N2O	Unit of Measure	GWP Factor for CO2	GWP Factor for CH4	GWP Factor for N2O	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure
Ground Business Travel - Mass Transit	Bus	Diesel	0.0	0.0			0.0	Miles	0.107	kg CO2/Passenger Mi	0.000006	kg CH4/Passenger Mile	0.000005	kg N2O/Passenger Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	Metro / Transit Rail	Electric	0.0	0.0			0.0	Miles	0.163	kg CO2/Passenger Mi	0.000004	kg CH4/Passenger Mile	0.000002	kg N2O/Passenger Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	Commuter Rail	Diesel	0.0	0.0			0.0	Miles	0.172	kg CO2/Passenger Mi	0.000002	kg CH4/Passenger Mile	0.000001	kg N2O/Passenger Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	Intercity Rail	Diesel	0.0	0.0			0.0	Miles	0.185	kg CO2/Passenger Mi	0.000002	kg CH4/Passenger Mile	0.000001	kg N2O/Passenger Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e

Sub-Total Rental Direct Fuel Purchase Emissions	0.0	MT CO2e
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Total Ground Business Travel Emissions	713.0	MT CO2e
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Total Ground Business Travel Emissions	713.0	MT CO2e
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Source: U.S. EPA Climate Leaders Program, Technical Guidance, Optional Emissions from Commuting, Business Travel, and Product Transport, see: http://www.epa.gov/stateply/documents/resources/commute_travel_product.pdf

Comments:

PNNL is using Advanced Methodology (B).

Receipts from rental vehicle fuel purchases were used to derive gallons consumed in rental vehicles. National average price of gasoline from EIA's Retail Gasoline Historic Prices was used instead of regional average price of gasoline. (Fuel consumption data by region is not currently available, but we will work to disaggregate by region in the future). National average price of gasoline was \$3.40 in FY2008.

Assumed all rental vehicles are passenger cars. Unable to disaggregate fuel use by vehicle type at this time.

For personal vehicle use, disaggregation of mileage by vehicle type is based on vehicle type data from PNNL's FY2008 employee commute survey. Of the employees that commuted in personal vehicles, 70% drove passenger cars and 30% drove SUVs/Trucks in FY2008. It was assumed that the same percentages applied to personal vehicle use for business ground travel.

Note: This version of the worksheet shows the calculation in cell A29 as adding cells A19-A22, when it

6 Scope 3: Employee (Federal and M&O Contractor) Commuting

Must be filled in
May be filled in

Process Type	Vehicle Type	Fuel Type	Total Daily Commute Distance Traveled (miles)	Number of Commute Days per Year	Total Mileage by Vehicle Type	Unit of Measure	Emission Factor CO2	Unit of Measure	Emission Factor CH4	Unit of Measure	Emission Factor N2O	Unit of Measure	Total Quantity Emitted CO2	Total Quantity Emitted CH4	Total Quantity Emitted N2O	Unit of Measure	GWP Factor for CO2	GWP Factor for CH4	GWP Factor for N2O	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure	Total Quantity Emitted by Type	Unit of Measure
Commuter Travel - Personal Owned Vehicles	POV Passenger Car	Gasoline	52,115.2	230.0	11,986,500.7	Miles	0.364	kg CO2/Mile	0.000031	kg CH4/Mile	0.000032	kg N2O/Mile	4,363,086.3	371.6	383.6	kg	1	21	310	CO2e	#####	kg CO2e	4,489.8	MT CO2e
	POV Passenger Car	Hybrid	1,214.5	230.0	279,335.7	Miles	0.192	kg CO2/Mile	0.000008	kg CH4/Mile	0.000005	kg N2O/Mile	53,632.5	2.1	1.4	kg	1	21	310	CO2e	54,107.3	kg CO2e	54.1	MT CO2e
	POV SUV or Truck	Gasoline	20,698.5	230.0	4,760,645.0	Miles	0.519	kg CO2/Mile	0.000036	kg CH4/Mile	0.000047	kg N2O/Mile	2,470,774.7	171.4	223.8	kg	1	21	310	CO2e	#####	kg CO2e	2,543.7	MT CO2e
	POV SUV or Truck	Diesel	1,801.2	230.0	414,282.8	Miles	0.561	kg CO2/Mile	0.000001	kg CH4/Mile	0.000015	kg N2O/Mile	232,318.8	0.4	0.6	kg	1	21	310	CO2e	232,520.2	kg CO2e	232.5	MT CO2e
	POV SUV or Truck	Hybrid	0.0	230.0	0.0	Miles	0.35	kg CO2/Mile	0.00001	kg CH4/Mile	0.000005	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
	POV Motorcycle	Gasoline	994.2	230.0	228,662.6	Miles	0.167	kg CO2/Mile	0.00007	kg CH4/Mile	0.000007	kg N2O/Mile	38,186.7	16.0	1.6	kg	1	21	310	CO2e	39,019.0	kg CO2e	39.0	MT CO2e
Commuter Travel - Car / Van Pools	Car Pool	Gasoline	6,751.0	230.0	1,552,720.1	Miles	0.182	kg CO2/Passenger Mile	0.0000155	kg CH4/Passenger	0.000016	kg N2O/Passenger Mile	282,595.1	24.1	24.8	kg	1	21	310	CO2e	290,802.0	kg CO2e	290.8	MT CO2e
	Van Pool	Gasoline	139.6	230.0	32,111.6	Miles	0.130	kg CO2/Passenger Mile	0.000009	kg CH4/Passenger	0.0000175	kg N2O/Passenger Mile	4,166.5	0.3	0.4	kg	1	21	310	CO2e	4,289.5	kg CO2e	4.3	MT CO2e
Commuter Travel - Mass Transit	Bus	Diesel	1,379.8	230.0	317,345.4	Miles	0.107	kg CO2/Passenger Mile	0.000006	kg CH4/Passenger	0.000005	kg N2O/Passenger Mile	33,956.0	0.2	0.2	kg	1	21	310	CO2e	34,009.1	kg CO2e	34.0	MT CO2e
	Metro / Transit Rail	Electric	308.9	230.0	71,037.4	Miles	0.163	kg CO2/Passenger Mile	0.000004	kg CH4/Passenger	0.000002	kg N2O/Passenger Mile	11,579.1	0.3	0.1	kg	1	21	310	CO2e	11,629.1	kg CO2e	11.6	MT CO2e
	Commuter Rail	Diesel	5.2	230.0	1,198.7	Miles	0.172	kg CO2/Passenger Mile	0.000002	kg CH4/Passenger	0.000001	kg N2O/Passenger Mile	206.2	0.0	0.0	kg	1	21	310	CO2e	206.6	kg CO2e	0.2	MT CO2e
	Intercity Rail	Diesel	0.0	230.0	0.0	Miles	0.185	kg CO2/Passenger Mile	0.000002	kg CH4/Passenger	0.000001	kg N2O/Passenger Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e
Commuter Travel - Human Powered	Walking and/or Bicycling		1,282.9	230.0	295,069.9	Miles	0	kg CO2/Mile	0	kg CH4/Mile	0	kg N2O/Mile	0.0	0.0	0.0	kg	1	21	310	CO2e	0.0	kg CO2e	0.0	MT CO2e

Total Commuter Travel Emissions 7,700.1 MT CO2e

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Source: U.S. EPA Climate Leaders Program, Technical Guidance, Optional Emissions from Commuting, Business Travel, and Product Transport, see: http://www.epa.gov/stateply/documents/resources/commute_travel_product.pdf
 Source: U.K. Defra Company Reporting Guidelines emissions factors for Hybrid vehicles <http://www.defra.gov.uk/environment/business/reporting/conversion-factors.htm>

Comments:

Data from an employee commute survey was used to derive total miles traveled per year by each mode of transportation for all employees for FY2008.

For each employee, an estimate of their commute miles travelled was derived by subtracting telecommuting, business travel, and extended leave from the 230 baseline assumption and multiplying those days by each employee's reported mileage.

Total miles traveled per year for each mode of transportation were summed for all employees and divided by 230 days per year to arrive at the Total Daily Commute Distance Traveled in miles.