Indian Health Service

Sustainability Progress Report

Fiscal Years 2014 and 2015

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LIST OF ACRONYMS AND ABBREVIATIONS

A/E	Architectural/Engineering
ACL	Acoma-Canoncito-Laguna
ANTHC's REI	Alaska Native Tribal Health Consortium's Rural Energy Initiative
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
BAS	Building Automation Systems
Btu	British Thermal Units
CDER	Center for Drug Evaluation & Research
CDR	Commander
CEQ	Council on Environmental Quality
DHHS	Department of Health and Human Services
ECM	Energy Conservation Measure
EISA 2007	Energy Independence and Security Act of 2007
EO	Executive Order
EPA	Environmental Protection Agency
EPAct	Energy Policy Act of 2005
ESC	Environmental Steering Committee
ESPM	ENERGY STAR Portfolio Manager®
FY	Fiscal Year
GGE	Gasoline Gallon Equivalent
GHG	Greenhouse Gas
GSF	Gross Square Feet
Guiding Principles	Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings
IHS	Indian Health Service
kBtu	Thousand British Thermal Units
kW	Kilowatt
kWh	Kilowatt-Hour
lbs.	Pounds
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
LT	Lieutenant
LTJG	Lieutenant (Junior Grade)
MMBtu	Million British Thermal Units
OEHE	Office of Environmental Health and Engineering
PE	Professional Engineer
PV	Photovoltaic
REC	Renewable Energy Certificate
SAB	Sustainability Advisory Board
SIP	Sustainability Implementation Plan
SSPP	Strategic Sustainability Performance Plan
VFD	Variable Frequency Drive
WCM	Water Conservation Measure
ZEB	Zero-Energy Building

MESSAGE FROM CHIEF SUSTAINABILITY OFFICER, GARY HARTZ

Welcome to the Indian Health Service (IHS) 2014-2015 Sustainability Progress Report, which describes the continued actions we have taken in the last couple of years to conserve resources, implement sustainable practices into standard agency operations, and be a good steward of the environment. This is the fourth report IHS has published with the purpose of communicating, externally and internally, the sustainability activities and accomplishments of IHS staff nationwide and at all organizational levels.

The report describes IHS's performance across different components of sustainability such as greenhouse gas (GHG) emissions, energy efficiency, renewable energy, and water conservation. It highlights exemplary IHS and tribal projects pursued over the past couple of years: the construction of LEED-certified buildings, the installation of a greywater system, and the operation of PV solar systems. The report also acknowledges IHS and tribal staff and teams that have received Department of Health and Human Services (DHHS) Green Champion Awards for their noteworthy contributions to sustainability. Lastly, this report helps IHS maintain accountability and transparency for our impact on the environment and facilitates our efforts to address the President's Executive Orders (EOs) regarding environmental sustainability.

Various EOs, environmental regulations, and policies guide how we implement sustainability strategies, but the concept is at the heart of the IHS Mission – to raise the physical, mental, social, and spiritual health status of the American Indian and Alaska Native people to the highest possible level. In fact, our history as a country is rooted in American Indian and Alaska Native cultures that hold a deep respect for the environment and its health, which is intrinsically linked to the human body and its health. Our modern history as an environmentally conscious country began in the 1970s. Faced with the consequences that air and water pollution were having on our health, we voiced our desire for a cleaner and more sustainable environment. Creating this positive change has been a challenge, but governments, nonprofits, businesses, and individuals have worked together to establish policies to curb climate change, fight species' extinction, conserve natural resources, and ensure our right to clean water. Today the topic of sustainability has a consistent and important presence in many of our conversations, actions, and policies.

So where does history take us from here? Back to our roots, where our respect for the environment and its health is reflected in the human body and our health. I hope you will be a part of our new history.

Gary J. Hartz, P.E., BCEE
Chief Sustainability Officer
Indian Health Service

1. DEFINING SUSTAINABILITY

Sustainability creates and maintains the conditions under which humans and nature have the capacity to exist in productive harmony, fulfilling social, economic, and other necessities of present and future generations. Sustainability is important to ensuring we have and will continue to have the water, materials, and resources to protect human health and our environment indefinitely.

Sustainability focuses on:

- Reducing energy and fuel usage
- Conserving water
- Minimizing waste
- Purchasing environmentally preferable products and services
- Implementing environmentally-responsible building practices in the planning, construction, and operation phases
- Changing individual behaviors in order to protect the environment for ourselves and future generations

Federal Regulations on Sustainability

The implementation of sustainable practices at the IHS is shaped by federal laws and regulations. Federal sustainability goals and objectives were originally established with the *Energy Policy Act of 2005* (EPAct) and the *Energy Independence and Security Act of 2007* (EISA 2007). EO 13514, *"Federal Leadership in Environmental, Energy, and Economic Performance"* incorporated the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)*, described on the next page, with other federal sustainability goals.

Released in March of 2015, EO 13693, "*Planning for Federal Sustainability in the Next Decade*," revoked EO 13514 and establishes a new set of sustainability goals, targets and requirements for federal agencies. EO 13693 establishes fiscal year (FY) 2025 targets for key measures, seeking to cut the government's greenhouse gas (GHG) emissions, reduce energy and water use intensity in federal buildings, and increase the share of electricity the federal government consumes from renewable sources. It also introduces new performance metrics and measures including a clean energy target, which combines renewable electric and alternative energy goals (e.g., geothermal), specific targets for data center energy efficiency, per-mile greenhouse gas emissions reductions for fleet vehicles, and percentages of zero-emission and plug-in hybrid vehicles in agency fleets. The EO emphasizes regional implementation while ensuring that regional actions are consistent with sustainability and climate priorities of local authorities. Agencies are still required to develop a Strategic Sustainability Performance Plan (SSPP) to discuss highlights and challenges from the previous year and how they will refine their strategies, expand on successes, and plan new initiatives to meet the EO goals. Agencies are expected to develop and maintain a variety of sustainability planning and implementation documents to supplement the SSPP. Since EO 13693 was released halfway through FY 2015, most performance goals are not applicable until FY 2016; therefore, EO 13514 remained the key driver for IHS sustainability efforts in FY 2014 and FY 2015.

Federal Guidelines and Tools

The *Guiding Principles* are a set of established criteria that require federal agencies to demonstrate "federal leadership in the design, construction, and operation of high-performance and sustainable buildings." IHS works to meet these guidelines in both new construction and existing buildings. The *Guiding Principles* outlines the following guidelines for federal agency buildings:

- Employ integrated assessment, operation, and management principles
- Optimize energy performance
- Protect and conserve water
- Enhance indoor environmental quality
- Reduce environmental impact of materials

Per EO 13693, the *Guiding Principles* were revised by the Council on Environmental Quality in February 2016. Notably, the recent update provides guidance on assessing and considering climate change risks. Climate change resilience is discussed further in Chapter 4.

IHS also follows the Guidelines for Energy Management developed by the joint Environmental Protection Agency (EPA) and Department of Energy (DOE) ENERGY STAR® program. ENERGY STAR® provides a road map for continuous improvement and best practices from the nation's leaders in energy management. ENERGY STAR Portfolio Manager® (ESPM) is an online tool to measure and track energy and water consumption, as well as greenhouse gases; and accounts for differences in operating conditions, regional weather data, and other important considerations. When reporting energy and water consumption in ESPM, this is particularly helpful for IHS, which operates a wide variety of building types across different locations and climate zones. IHS uses ESPM to collect, compile, and report agency-aggregated data on an annual basis to calculate GHG emissions. IHS follows the Guidelines for Energy and Water Management illustrated in the graphic to the right.

To learn more about ESPM visit:
http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

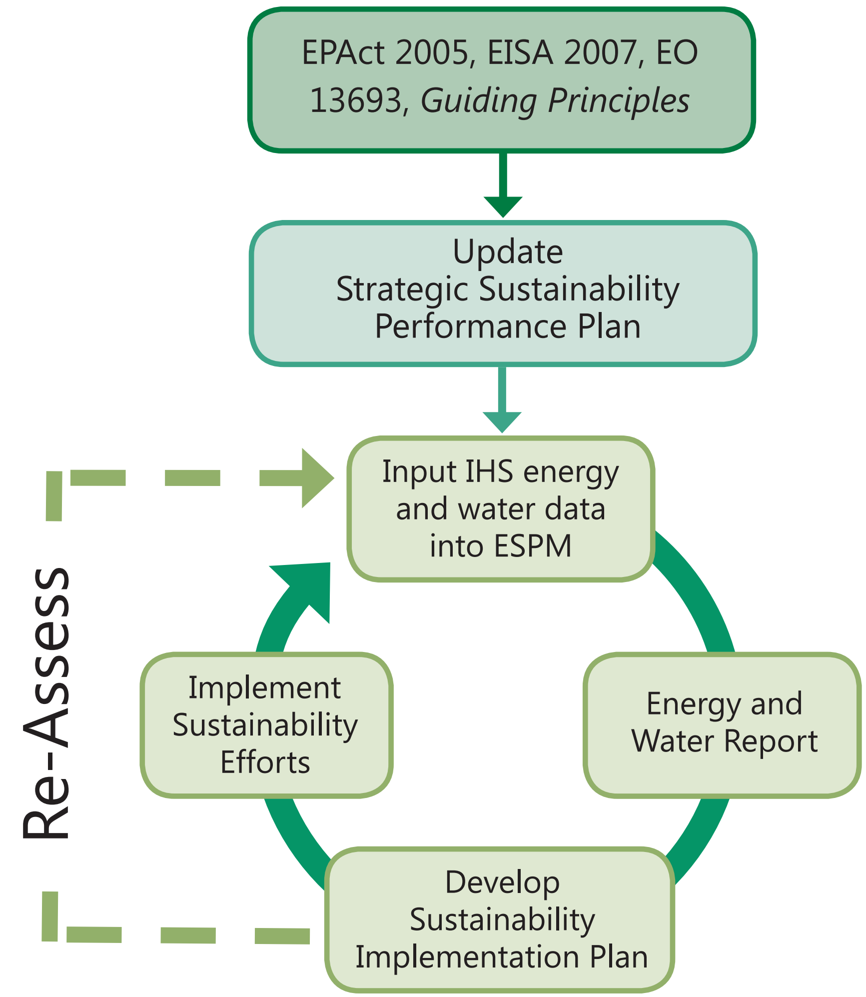


Figure 1-1. Diagram of Guidelines for Energy and Water Management at IHS

Leadership in Energy and Environmental Design (LEED) is the US Green Building Council's internationally-recognized green building certification system. It provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations, and maintenance solutions. IHS designs new facilities according to the six LEED core concepts and strategies shown to the right.

As prescribed in the A/E Design Guide, LEED Silver certification is required for major renovations and new construction. Higher levels of certification are desired and encouraged when cost effective to do so. At a minimum, LEED Gold certification is used as a target to create a buffer to ensure LEED Silver certification is achieved.

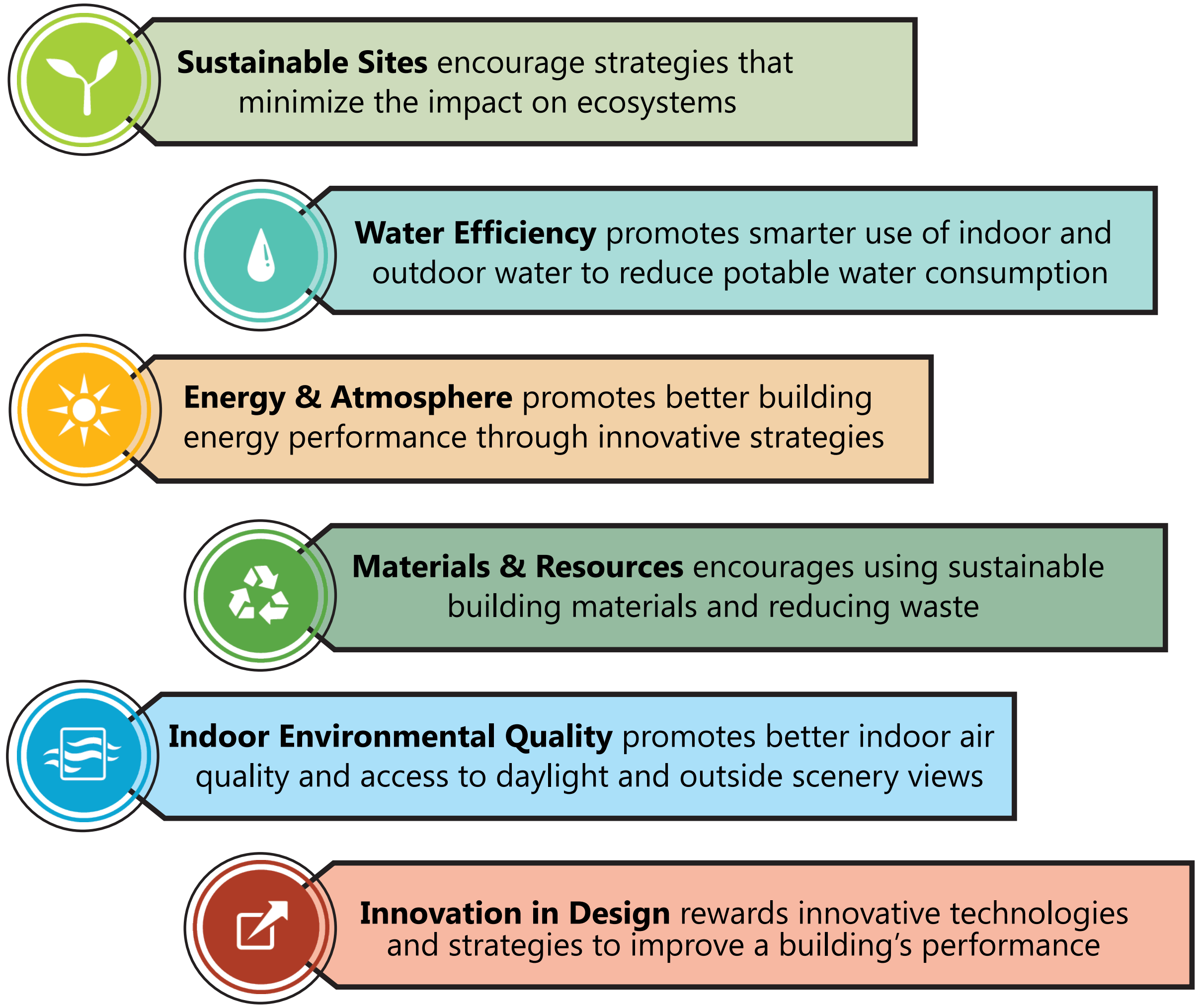


Figure 1-2. LEED Core Concepts and Strategies

IHS Guidelines and Resources

The IHS Office of Environmental Health and Engineering (OEHE) Architectural/Engineering (A/E) Design Guide describes requirements for the design and construction of federally-funded IHS facilities. The A/E Design Guide's sustainability chapter includes guidance for reducing environmental impacts and improving human health in new and existing construction. The sustainability chapter proposes "sustainability requirements to ensure that IHS facilities are designed and constructed in a manner that enhances indoor environmental quality for users while reducing the production and consumption of greenhouse gases and ensures diversion of construction debris from landfills."

These include:

- Requirement to use ESPM as an energy benchmarking tool
- Prohibition of the use of potable water for landscaping
- A new requirement to use EPA WaterSense-labeled products
- Guidance and requirements for the implementation of Building Information Modeling (BIM) into the design, construction, and operation of new facilities

The A/E Design Guide incorporates the *Guiding Principles* and the LEED certification program described on the previous pages. The OEHE Technical Handbook is another important guidance document intended to support implementation of IHS policy, and to identify standards and regulations for technical services that IHS provides. It provides a mechanism for the Environmental Steering Committee (ESC) to prioritize sustainability-related projects, discussed further in Chapter 2.

2. IHS SUSTAINABILITY PROGRAM

The IHS strives to meet all federal requirements and be forward-acting on all environmental efforts. This is reflected in different aspects of the IHS Sustainability Program, including the IHS Environmental Policy Statement, the Sustainability Advisory Board (SAB), the Environmental Steering Committee (ESC), sustainable building construction and operation policies and practices, and IHS employee efforts. To minimize our impact on the environment, IHS staff, contractors, and suppliers consider environmental concerns at the earliest stage possible.

This Progress Report focuses on the following elements of the Sustainability Program during fiscal year (FY) 2014 and FY 2015:

- Implementing energy and water conservation measures
- Implementing and tracking sustainability goals through the SAB
- Tracking utility costs and consumption using ENERGY STAR Portfolio Manager ® (ESPM)
- Ensuring staff receive appropriate environmental training
- Communicating sustainability activities through this Progress Report and other recognition and communication opportunities

Sustainability Implementation Plan & Strategic Sustainability Performance Plan

Each year IHS develops a Sustainability Implementation Plan (SIP), a planning and reporting document that supports the development of annual DHHS Strategic Sustainability Performance Plans (SSPPs). The SIP and SSPP help track progress, set objectives, and manage different federal goal areas as they relate to sustainability. The SIP is organized into goal areas that correspond loosely with EO 13514. These 10 goal areas include:

- Greenhouse Gas (GHG) Reductions
- Sustainable Buildings
- Fleet Management
- Water Use Efficiency & Management
- Pollution Prevention & Waste Reduction
- Water Use Efficiency & Management
- Sustainable Acquisition
- Electronic Stewardship & Data Centers
- Renewable Energy
- Climate Change Resilience
- Energy Performance Contracts

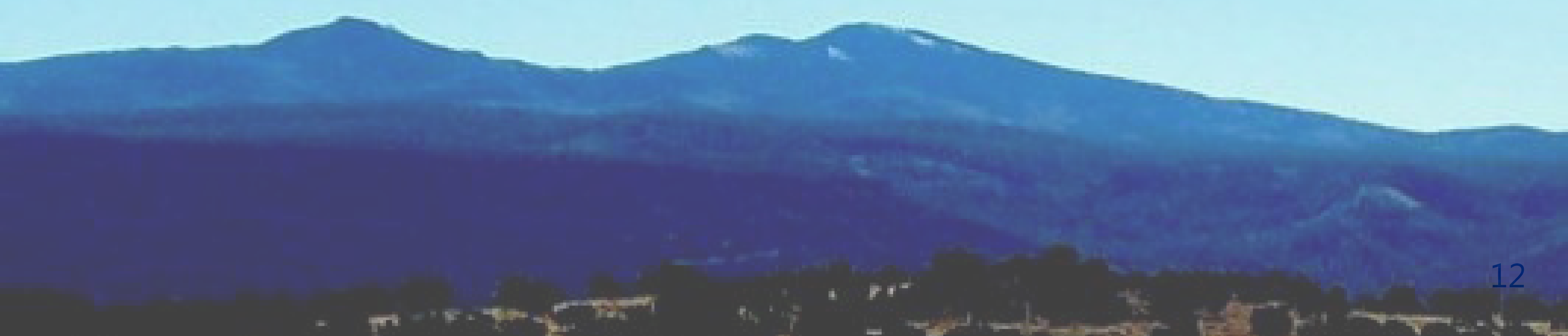
Each year, the SIP sets objectives within each goal area that enable the IHS to meet requirements stipulated in the EO, and IHS develops tools and strategies to reach these objectives. The SIP tracks and describes agency progress, and identifies hindrances and challenges to progress in goal areas. IHS updates the objectives in the SIP with the aim of meeting the federal requirements for each goal area, adjusting the tools or strategies as needed.

Sustainability Advisory Board

The SAB is the central reviewing body for sustainability issues or questions requiring executive decisions. It is made up of representatives from offices throughout IHS and is chaired by IHS Chief Sustainability Officer Gary Hartz. The Board is chartered to:

- Coordinate a multiple-office approach to support cross-cutting EO 13514 sustainability initiatives
- Promote environmental sustainability as a way of doing business and emphasize return-on-investment benefits
- Ensure IHS planning incorporates practices that support sustainability needs

As described in the previous section, the SAB assists the IHS in meeting the DHHS SSPP by developing the SIP and setting goals and targets to implement environmental sustainability initiatives. During quarterly meetings, members discuss updates and progress on sustainability goals, current challenges, and upcoming events and deadlines. The SAB realized many achievements in FY 2014 and FY 2015, including strengthening fleet management, sustainable buildings, renewable energy use, and water use efficiency which will be described in the following sections.



Environmental Steering Committee

The ESC includes OEHE staff that review and fund applications for water and energy efficiency and environmental remediation and demolition projects. The ESC prioritizes project proposals that emphasize sustainable practices and meet sustainability requirements in the A/E Design Guide. Many of the sustainability projects implement recommendations that resulted from sustainability audits, such as the Feather River light-emitting diode (LED) upgrade featured in the following pages.

In FY 2014, the ESC approved about $1.8 million in sustainability, demolition, and remediation projects. Of the $1.8 million, $1.2 million funded sustainability projects for lighting upgrade, energy efficiency, and energy reduction projects. For example, the wind-to-heat energy project at Kotzebue, AK funded the design and construction of equipment to utilize excess wind energy from the local utility cooperative. During high wind events, that excess electrical energy is dumped, in order to prevent the battery bank from being overcharged. With the project at Kotzebue, the excess energy will instead be utilized to convert electricity into heat for hospital space and process heating. This project is expected to reduce the hospital's fuel oil consumption by up to 20 percent by directly saving an estimated 32,000 gallons per year.

The ESC approved over $500,000 in funding for demolition and remediation projects in FY 2014. For example, the environmental remediation and demolition project at Warm Springs, OR will consist of abating asbestos-containing materials and lead-based paint prior to demolition and returning the land to usable condition. The project in a building at Tsaile, AZ will consist of asbestos abatement in the floor tile mastic and exterior roof patching; and removing the 270-kilowatt (kW) diesel gas-fueled emergency generator. Table 2-1 summarizes the projects funded by the ESC in FY 2014.

Table 2-1. FY 2014 Environmental Steering Committee-Funded Projects

Funded Project	Amount Funded by ESC
Sustainability Projects	
Energy Efficient Lighting Upgrade at Southeast Alaska Regional Health Consortium	$257,682
LED Lighting Upgrade at Yukon-Kuskokwim Delta Regional Hospital	$235,950
Northern Cheyenne Sustainability Project	$338,500
Wind-to-Heat Energy Project at Kotzebue	$290,531
Cass Lake Hospital Energy Reduction Project	$65,000
Lac Vieux Desert Health Center Energy Reduction Project	$8,000
TOTAL ESC-FUNDED SUSTAINABILITY PROJECTS	**$1,195,663**
Demolition and Remediation Projects	
Environmental Remediation and Demolition of Building at Tsaile	$180,000
Demolition of Two Buildings at Phoenix Indian Medical Center	$40,000
Environmental Remediation and Demolition of Quarters at Warm Springs	$149,450
Housekeeping Flooring Abatement at Yukon-Kuskokwim Delta Regional Hospital	$28,333
Site Characterization at Mt. Edgecombe Hospital	$167,608
TOTAL ESC-FUNDED REMEDIATION AND DEMOLITION PROJECTS	**$565,391**
TOTAL ESC-FUNDED PROJECTS	**$1,761,054**

In FY 2015, the ESC approved more than $8.5 million in sustainability, demolition, and remediation projects. Over $2.3 million was funded for sustainability projects, including several energy audits which serve to establish the baseline of usage and identify conservation opportunities. For example, energy improvements at the Unity Youth Regional Treatment Center will address energy audit findings including attic insulation, solar hot water, building management system improvements, a variable frequency drive (VFD) fan motor upgrade, and installation of lighting sensors. The payback for this project is 14.8 years.

In FY 2015, the ESC approved about $6.1 million in funding for demolition and remediation projects to properly manage lead, asbestos, and other hazardous materials. An example project is the removal of underground storage tanks (USTs) that are at high risk of leaking petroleum or hazardous substances and contaminating soils and groundwater. At Cherokee Indian Hospital, for example, ESC funding will reimburse costs for removal of USTs, soil testing, and repaving of the area. Table 2-2 summarizes the projects funded by the ESC in FY 2015.

Table 2-2. FY 2015 Environmental Steering Committee-Funded Projects

Funded Project	Amount Funded by ESC
Sustainability Projects	
PV Solar Project - Donald LaPointe Health Center and New Day Treatment Center	$162,600
White Earth Sustainability Project	$585,000
Energy Reduction Project at Sault St. Marie	$50,000
Little Traverse Bay Bands Health Clinic Energy Audit	$65,000
Energy Improvements at Unity Youth Regional Treatment Center	$121,000
Phoenix Indian Medical Center Alternative Solar Power	$860,000
Bay Mills Health Center Energy Audit	$10,000
Ho-Chunk Nation Black River Falls Health Center and Behavioral Health Center Energy Audit	$20,000
Nottawaseppi Huron Band Health Centers Energy Audit	$30,000
Peter Christensen Health Center Energy Audit	$15,000
Ho-Chunk Health Center and Behavioral Health Energy Audit	$30,000
Hannahville Indian Community Health Center Energy Audit	$10,000
Solar Cell Project at Pokagon Health Center	$225,000
Menominee Tribal Clinic Energy Audit	$15,000
LED Streetlights at Pine Ridge Hospital	$61,000
Feather River LED Lighting Retrofit	$76,700
TOTAL ESC-FUNDED SUSTAINABILITY PROJECTS	**$2,311,700**

FY 2015 Environmental Steering Committee-Funded Projects (Continued)

Funded Project	Amount Funded by ESC
Demolition and Remediation Projects	
Yukon-Kuskokwim Health Corporation Hazardous Material Survey and Environmental Assessment	$98,500
Environmental Remediation of Radon at Tahlequah	$23,000
Environmental Remediation and Demolition of 7 Buildings at Sells	$99,000
Abatement and Demolition of Staff Housing Unit	$187,800
Asbestos Remediation IHS MB Choctaw Hospital Building 32070-00001	$153,100
Demolition of Shiprock Quarters 00132	$50,000
Demolition at Crownpoint Quarters and Pueblo Pintado Clinic 031215	$490,000
UST Removal and Remediation at Cherokee Indian Hospital Building	$137,000
Albuquerque Indian Dental Center Asbestos Abatement 2015	$190,000
Albuquerque Indian Health Center Stucco and Window Asbestos Abatement & Replacement	$600,000
Zuni Renovations	$250,000
Environmental Remediation for Red Lake Hospital Grounds - Building 11498-00N12	$101,700
Demolition of 3 Buildings at Phoenix Indian Medical Center	$48,000
Demolition of 3 Claremore Buildings	$30,000
Demolition of 6 Buildings at Lower Yard Anchorage	$92,400
Demolition of 2 White Earth Buildings	$120,000
Environmental Remediation and Demolition of 7 Buildings at Sells	$29,000
Demolition of Trailer at Wellpinit	$30,000
Fort Defiance Building Remediation and Demolition Phase II	$3,500,000
TOTAL ESC-FUNDED DEMOLITION AND REMEDIATION PROJECTS	**$6,229,500**
TOTAL ESC-FUNDED PROJECTS	**$8,541,200**

Feature: Feather River LED Lighting Upgrade

The Feather River Tribal Health, Inc. Health Clinic located in Oroville, CA provides health services mainly to the Maidu Tribe of the Berry Creek, Mooretown, and Enterprise Rancheria. In FY 2015 this tribally-owned clinic completed a lighting retrofit to replace 1,700 less energy efficient light fixtures across the facility including building interior, exterior, and parking lot lights with LEDs. This project results in lower energy use and costs, reduced environmental impacts, and improved building performance.

The upgrade to LEDs replaces 1,700 lighting fixtures, primarily fluorescent lamps and tubes, reducing the facility's lighting electricity use by approximately 38 percent (an estimated 266,304 kilowatt-hours [kWh] per year). At current electric rates, the project is expected to achieve over $17,000 in annual cost savings. The estimated project cost is $153,000, resulting in simple payback of nine years. In addition to these electricity savings, LEDs have a service life almost twice as long as typical fluorescent lamps. By reducing material costs of replacement fixtures and labor costs associated with installing replacements, the project will lower Feather River's lighting-related maintenance costs by approximately 40 percent.

Table 2-3. Feather River LED Project Summary Table

Annual Electrical Savings	Annual Cost Savings	Estimated Project Cost	Simple Payback
266,000 kWh	$17,000	$153,000	9 years

The project decreases the facility's carbon footprint by reducing GHG emissions. Energy savings reduce direct emissions associated with electricity generation, and the reduced number of replacement fixtures lowers indirect emissions by eliminating lifecycle emissions from processes such as extraction of raw materials, manufacturing, and disposal.

LEDs provide a safer alternative to fluorescent lights. Fluorescent lamps and tubes are considered universal waste in California and must be discarded appropriately because they contain mercury. While LEDs may contain low levels of lead or nickel, they are very durable and do not break easily.

LEDs reduce light pollution from building exterior and parking lot lights. The original outdoor light fixtures shined light into surrounding areas (known as light trespass), which can cause annoyance, discomfort, distraction, or reduce visibility. The LEDs installed in this project provide directed lighting, which reduces light trespass concerns.

Last but not least, the project increases building performance: LEDs typically provide higher quality lighting than fluorescent fixtures. Outdoors, this results in higher visibility and improved night time security. Indoors, enhanced light quality from LEDs has been shown to create a healthier work environment and can increase the productivity and morale of staff.

Table 2-4. Feather River LED Upgrade -
System, Maintenance & Carbon Footprint Summary

System Summary	
Number of Fixtures	1,679
Total Project Cost	$153,297
Pre-Retrofit Lighting Cost	$44,778
Pre-Retrofit Energy Use	700,800 kWh
Post-Retrofit Lighting Cost	$27,556
Post-Retrofit Energy Use	434,496 kWh
Electrical Savings	38 percent (%)
Simple Payback	8.9 years
Maintenance Summary	
Fluorescent Lamp Life	30,000 hours
LED Lamp Life	50,000 hours
Maintenance Time & Cost Savings	40%
Labor Savings after 10 years (assuming $40/hr-fixture)	$90,000
Carbon Footprint Summary	
Annual Electricity Savings	266,000 kWh
Pounds (lbs.) of Carbon Avoided Each Year	163,000 lbs.
Pounds of Carbon Avoided Each Day	450 lbs.
Equivalent Energy Use per Year	7 homes

3. ENERGY MANAGEMENT AND GHGs

Greenhouse Gas Emission Reductions

EO 13514 calls for federal agencies to set targets for greenhouse gas (GHG) emission reductions relative to a fiscal year (FY) 2008 baseline. The greenhouse gas emissions generated directly and indirectly by a federal agency are based on the source of the emissions. Direct GHG emissions include those from fossil fuels burned on-site, entity-owned or entity-leased vehicles, and other direct sources. Indirect GHG emissions result from the generation of electricity, heating and cooling, or steam generated off site but purchased by the IHS, and the transmission and distribution losses associated with some purchased utilities (e.g., chilled water, steam and high temperature hot water). Other indirect GHG emissions sources are neither owned nor directly controlled by IHS; but are related to IHS's activities (e.g., employee travel and commuting, contracted solid waste disposal, and contracted wastewater treatment).

Many of IHS's energy conservation, fleet management, renewable energy, and other sustainability efforts reduce both direct and/or indirect GHG emissions, as discussed in the next several sections.

Energy Performance

The IHS building portfolio includes more than four million square feet of federally operated space that annually reports energy use. In FY 2003, IHS consumed a total of 1,311,076 million British thermal units (MMBtu) which represents 199.6 thousand Btu (kBtu) consumed per gross square foot (GSF). The measure of energy use per GSF is known as energy intensity, and is the basis for federal energy reduction requirements. In FY 2014, IHS consumed a total of approximately 498,741 MMBtu, or 123.8 kBtu/GSF. In FY 2015, IHS consumed a total of approximately 598,247 MMBtu or 148.5 kBtu/GSF. This is an overall reduction from the 2003 baseline of 26 percent. The IHS building portfolio's energy use is provided in the table below.

Table 3-1. Summary of energy consumption from FY 2014-2015 compared to the baseline year (FY 2003)

Fiscal Year (FY)	Energy Use (MMBtu)	Energy Intensity (kBtu/GSF)
2003 (Baseline)	1,311,076	199.6
2014	498,741	123.8
2015	598,247	148.5

IHS reduced overall energy intensity, or energy use per square foot, by 26 percent in the last 12 years.

Energy Conservation Measures

The IHS conducted a series of Sustainability Audits, and the resulting reports provided each facility with details and specific recommendations, including energy conservation measures (ECMs) to improve water efficiency. Common ECMs being implemented at IHS facilities include installing higher efficiency cooling towers, integrating building automation systems (BAS), turning off recirculation pumps, cleaning or replacing filters, and weatherizing the facility.

Install Cooling Towers – For larger office buildings with chillers, cooling towers are an essential component in rejecting heat by evaporating water to the atmosphere. The more effectively a cooling tower can reject the heat from the condenser water feeding the chiller, the more energy can be saved by the building. Mechanical control solutions (e.g., variable frequency drive [VFD]) for the cooling tower fans can maximize the heat rejection of equipment needed, allowing the chiller to work less; resulting in energy savings. Maintenance strategies, such water blowdown optimization and water treatment, minimize the build-up of minerals blocking pipes and improve the heating transfer that occurs in the system.

Integrate a BAS – A BAS centralizes the operation of building systems through the use of sensors and controls, providing greater monitoring capabilities and optimizing equipment performance. BAS controls can adjust or turn equipment on or off depending on time of day, day of the week, outside air temperature, occupancy, or a number of other variables. These controls serve to synchronize heating and cooling equipment (e.g., boilers, chillers) operations with building occupancy, operating needs, and environmental conditions – matching operating parameters to the current building load. Building systems typically use less energy and water when operating parameters are regularly adjusted to load. For example, as the outside temperature decreases, the BAS can reset the temperature of chilled water (used to cool a building's air and equipment) as well as control the precise sequencing of the pumps, cooling tower and chillers. Alternatively, a BAS can lock out a chiller and its associated pumps on a certain date, when the outside air falls below a certain temperature, or when building cooling requirements are minimal.

Turn off Recirculation Pumps – In commercial buildings, domestic hot water systems often utilize recirculation pumps to circulate the hot water throughout the building. However, the use of pumps requires additional energy from the motors and hot water heater. Identifying hours to shut off recirculation pumps based on the hours of occupancy allows savings from both the motors and domestic hot water system.

Clean/Replace Filters – Air handler units (AHUs) continuously use fans to condition and distribute air throughout the building. The air is passed through filters to ensure clean air is provided. Over time, these filters can get dirty, causing fans to work harder to push the same amount of air throughout the building than if they were clean. Establishing a proper filter cleaning schedule ensures that fans work optimally and save energy.

Weatherize the Facility – Air gaps in buildings allow unconditioned air to enter the building, unnecessarily increasing energy consumption to cool or heat the space. These sources can include window sills, door frames, sliding glass doors, attic soffits, and basement foundations. The use of closed-cell foam and other air blocking methods can help reduce the amount of unconditioned air that enters a building, allowing the heating, ventilation, and air conditioning (HVAC) system to operate more effectively.

Energy Improvement Projects

To achieve the substantial reduction in energy intensity, IHS has completed energy improvement projects that incorporate the ECMs described above across its nationwide building portfolio. Examples of successful, energy-saving projects are described in the following pages.

In the **Billings Area**, the Crow/North Cheyenne Hospital completed a lighting upgrade that replaced existing high pressure sodium fixtures in the building parking areas to light-emitting diodes (LEDs) using retrofit kits. The lighting upgrades save an estimated 190,000 kilowatt-hours (kWh) and $16,800 per year. The total project cost was $84,580, resulting in a simple payback period of approximately five years. Also in the Billings Area, the Crow/Northern Cheyenne Health center completed a lighting upgrade that included both fixture replacements and lighting controls. In the building interior, fluorescent fixtures were replaced with LEDs, and occupancy sensors were installed in restrooms and some office spaces. In the parking area, existing high pressure sodium lights were fitted with LED replacements. All other exterior lights, including those for walkways and on bollards, were upgraded from fluorescent fixtures to LEDs. The lighting upgrades save an estimated 619,000 kWh equating to $55,400 per year. The total project cost was $338,484, resulting in a simple payback period of less than six years.

In addition to the lighting upgrade, the Crow/Northern Cheyenne Hospital completed a boiler replacement project. Two old, failing boilers were replaced with three new dual fuel (propane and natural gas) condensing boilers. Condensing boilers extract additional heat from exhaust gases by condensing water vapor produced during combustion into liquid, increasing boiler efficiency. The new boilers are rated at 97 percent efficiency, which will result in substantial energy and cost savings for the facility.

Figure 3-1. Crow/Northern Cheyenne Health Center Parking Lot LEDs

Figure 3-2. Crow/Northern Cheyenne Hospital Condensing Boilers

In the **Phoenix Area**, the Phoenix Indian Medical Center completed a heating, ventilation, and air conditioning upgrade to improve building performance and reduce energy use. The existing system, consisting of three rooftop units, 65 fan coils, and electric resistance heating, was upgraded to an air-cooled variable refrigerant flow system. Immediate energy savings from the project were verified through analysis of electricity bills.

In the **Navajo Area**, a comprehensive lighting upgrade was completed at the Inscription House Health Center. Exit signs, landscape lighting, heliport lighting, and perimeter lighting consisting of a mix of high pressure sodium lamps, T-12 fluorescent lamps, and incandescent lamps were replaced with LEDs. The project reduced facility electricity costs by approximately $60,000 per year. The total project cost was $113,000, resulting in a simple payback period of less than four years.

Renewable Energy

Renewable energy technologies are considered clean sources of energy and have a much lower environmental impact than conventional energy technologies. Many types of renewable energy, like solar and wind power, come from resources that are not depleted by human use. Conversely, finite resources - like fuel oil, coal, or natural gas - cannot be renewed at a sufficient rate for sustainable economic extraction.

IHS advocates for the implementation of renewable energy technology wherever feasible and cost-effective. Areas and tribal entities may apply for renewable energy projects to be funded by the Environmental Steering Committee (ESC). The purchase of renewable energy certificates (RECs) helped IHS meet its renewable energy targets in FY 2014 and 2015. A REC is a tradable environmental commodity that represents the environmental attributes of energy produced by renewable generation systems as opposed to conventional methods of producing electricity, such as burning coal and natural gas. The owner of a REC, which may be purchased separately from electricity, can claim the environmental benefits associated with renewable energy generation. This provides an easy way to invest in renewable energy without building a separate system. In FY 2014, IHS purchased RECs that accounted for more than 15 percent of agency electricity used. In FY 2015, the IHS introduced photovoltaic (PV) systems at three facilities – Pine Ridge, Rosebud, and Santa Rosa hospitals. Overall, 10.4 percent of electricity used at IHS was considered renewable energy through a combination of on-site electricity generation from these solar PV systems and purchased RECs.

In FY 2014, 15.3 percent of all energy used at IHS was renewable, from the purchase of RECs. In FY 2015, 10.4 percent of all energy used at the IHS was renewable, through on-site solar PV electricity generation and the purchase of RECs.

IHS has entered into a five-year plan (FY2015-2019) to purchase RECs through the Defense Logistics Agency. FY 2015 RECs have been purchased and should be received by mid-December, and contracting vehicles are in place to procure RECs through 2020 with an annual task order. While RECs represent much of IHS's renewable energy use, examples of completed and planned integration of renewable energy are discussed below.

Feature: Acoma-Canoncito-Lagunita Hospital Solar Project

The ESC provided funding to the Acoma-Canoncito-Lagunita (ACL) Hospital in Acoma, NM to install a roof-top solar system. Based on a preliminary estimate of baseline utility usage, the solar array will supply 253,000 kWh of electricity per year, significantly reducing the overall amount purchased from the local utility provider and saving an expected $47,000 annually. While solar power will not meet all of the hospital's electricity requirements, it will significantly reduce the overall amount of electricity purchased from the local utility provider, especially from peak daytime loads.

ACL Hospital had existing glycol solar panels that were no longer functional. These glycol panels were removed and replaced with a solar PV array; using the original structural supports reduced the initial capital cost for the project. The simple payback for this project is 12.5 years.

The ACL Hospital Solar Project will provide $47,000 in annual savings, with a simply payback of 12.5 years.

Figure 3-3. ACL Rooftop PV Solar System

Sustainable Buildings

IHS follows several guidance documents to develop its sustainable buildings program, including the Office of Environmental Health and Engineering (OEHE) Technical Handbook, the IHS Architectural/Engineering (A/E) Design Guide, Energy Independence and Security Act (EISA) 2007, EPAct, EO 13514, EISA 2007 and the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)*.

Per EISA 2007, new agency building designs must reduce fossil-fuel generated energy consumption by 65 percent by 2015, compared to a FY 2003 baseline. If life-cycle effective, new buildings must be designed to be 30 percent more energy efficient than the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) 90.1 - 2007 minimum requirements. In 2014 and 2015, the Division of Engineering Services (DES) managed the design and construction of several energy-efficient healthcare facility projects.

The **Fort Yuma Health Center** design was completed in 2010 in full compliance with the *Guiding Principles*. Construction funding was not received until 2015. The design was then updated to ensure compliance with current codes and standards, including an additional $1 million for solar photovoltaic capability. The photovoltaic system design incorporates both rooftop units as well as covered parking spaces, providing a secondary benefit. The project has been designed to be 77 percent more energy efficient than the ASHRAE 90.1 baseline, achieve Leadership in Energy and Environmental Design (LEED) Gold certification, and be capable of generating 50 percent of the annual on-site electrical load. Construction began in February 2016.

The **Kayenta Health Center** was designed to meet the *Guiding Principles*, and a LEED Silver Certification is being pursued. The 80-kW PV project at the Kayenta Health Center in the Navajo Area was designed to cover 2.5 percent of its energy cost. The energy performance achieved 28 percent efficiency (as opposed to 30 percent more energy efficient than the ASHRAE 90.1 baseline).

Figure 3-4. Aerial View of Kayenta Staff Quarters

Feature: Evaluating the Potential for Net-Zero Energy Buildings at IHS

Federal laws and EOs require agencies to begin moving toward net-zero energy buildings (ZEBs), defined as "designed, constructed, or renovated and operated such that the actual annual source energy consumption is balanced by on-site renewable energy." Specifically:

- New buildings entering the planning phase in FY 2020 or thereafter must be designed to achieve net-zero energy
- Promote environmental sustainability as a way of doing business and emphasize return-on-investment benefits

Designing and constructing ZEBs is challenging. Net-zero buildings require a combination of energy efficiency and on-site renewable energy generation. However, as photovoltaic (PV) system capabilities increase, costs trend downward, and design requirements approach sustainability. IHS posed a simple question: How close is the agency to making ZEBs a reality? In 2014, IHS conducted a study to answer this question, following the steps below:

- Develop a building energy model for a prototypical IHS staff quarters in each of the 12 climate zones IHS facilities are located. The model estimated the annual building energy required in each zone, assuming buildings were designed to meet current energy efficiency standards.
- Determine the PV system size required (in kilowatts [kW]) in each climate zone to meet estimated building energy needs, considering the solar resource available in each zone. As shown in Figure 3-5, solar resources vary widely across the US.
- Estimate the cost effectiveness of installing the required PV in each zone. Market trends and data were used to estimate system cost, and the simple payback period was calculated based on expected annual energy cost savings.

In summary, the survey determined that designing and constructing ZEBs is likely feasible in many IHS locations, but additional study is required to confirm this conclusion on a site-by-site basis. Assumptions required to simplify the study, such as (a) ground source heat pumps are feasible at all sites and (b) utility companies will buy the excess electricity generated on-site, may not hold true everywhere.

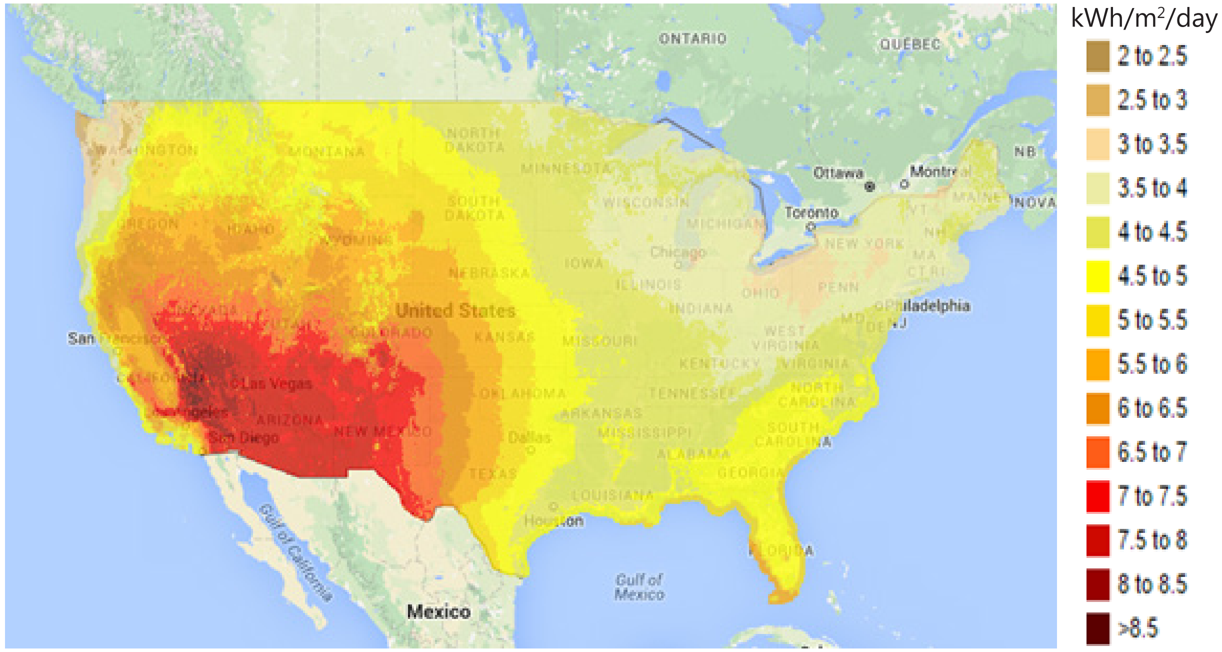


Figure 3-5. Map of Solar Resources in the Continental US (National Renewable Energy Laboratory)

On average, estimated payback for the solar PV systems was 30 to 40 years. While this is a long payback period, for most sites it falls within the 40 year period specified by EISA 2007 for renewable projects. As technology improves and costs drop, ZEBs will continue to become more attainable for IHS.

Telework

IHS has increased telework participation to reduce GHG emissions associated with employee commuting. Through continuing education and promotion of the telework program, the number of teleworkers increased from 148 in the first quarter of FY 2015 to 191 in the first quarter of FY 2016. The number of estimated annual telework days increased from 20,982 to 26,832 during the same period; the number of days teleworked per quarter increased from 3,432 to 6,708. Since most IHS employees are direct patient care providers and therefore must provide on-site support, a relatively small portion of employees are eligible for telework.

Fleet Management

In FY 2014 and 2015, IHS focused on ways to reduce and better align assets to meet agency needs while saving money, mitigating risk, and minimizing impact on the environment. To optimize the efficiency and effectiveness of fleet assets across the agency, IHS accomplished the following:

- Continue to reduce the fleet inventory. From FY 2013 to FY2014, IHS reduced its inventory by 38 vehicles. From FY 2014 to FY 2015, the IHS further reduced its inventory by 15 vehicles. Twenty-seven fewer vehicles were acquired in FY 2014 than in FY 2013; and twenty fewer vehicles were acquired in FY 2015 than in FY 2014.
- Reduce fuel consumption. Total fuel consumption decreased about one percent (62,979 gasoline gallon equivalents [GGEs]) from FY 2013 to FY 2015. Fifty-eight percent of the FY 2015 IHS fleet is fuel-efficient.
- Reduced total miles traveled by carpooling, eliminating trips, and improved scheduling. The total miles traveled in FY 2015 decreased by 12,406,653 miles, or by 46 percent compared to the total miles traveled in FY 2013 (26,780,411 miles).
- Right-size fleet. In FY 2015, 344 zero emission and plug-in hybrid vehicles were replaced with low-emitting GHG vehicles, an increase of 15 percent compared to FY 2014. Best management practices include replacing a fleet with fuel efficient vehicles and minimizing the acquisition of sport utility vehicles (SUV) unless absolutely necessary.
- Increase purchase and use of hybrids. The purchase and use of hybrids continues to increase. In 2013, the IHS vehicle inventory included 50 hybrids; 65 hybrids in FY 2014; and 77 hybrids in FY 2015.

4. WATER EFFICIENCY

The Office of Environmental Health and Engineering (OEHE) Architectural/Engineering (A/E) Design Guide and *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)* direct new construction projects to:

- Design indoor water systems to reduce potable water consumption by 20 percent compared to the baseline established for that building
- Install water meters to manage water use
- Use water efficient landscape and irrigation strategies to reduce outdoor potable water consumption
- Employ design and construction strategies that reduce storm water runoff and discharges of polluted water offsite
- Use the Environmental Protection Agency's (EPA's) WaterSense-labeled products or programs

Water Conservation Measures

The IHS conducted a series of Sustainability Audits, and the resulting reports provided each facility with details and specific recommendations, including water conservation measures (WCMs) to improve water efficiency. Common WCMs being implemented at IHS facilities include performing building retro-commissioning, integrating building automation system (BAS), and installing low-flow water fixtures.

Install Low-Flow Water Fixtures – Replacing fixtures such as faucet aerators, shower heads, toilets, urinals, and spray valves with low-flow water fixtures is a simple and typically cost-effective opportunity that instantly saves water with little impact on building operation. Reducing water use also saves the energy used to pump, heat, and treat the water. When possible, the IHS purchases products with the EPA's WaterSense logo. Due to the medical environments at IHS facilities, the appropriate low-flow fixtures are specified to prevent the growth of biological agents.

Implement Building Retrocommissioning – Throughout a building's lifetime chilled water, heating water, and domestic hot water systems must be maintained to ensure functional operation and optimize performance. System efficiencies may drop if leaks occur or filters clog, resulting in higher water costs. Implementing a retrocommissioning strategy for each building system can help minimize operational inefficiencies. Retrocommissioning actions that can lead to water savings include leak detection, equipment blowdown optimization, water sub-meter measurement, and overflow alarms. Ideally, retrocommissioning studies and follow-on actions are integrated in the building operations & maintenance (O&M) plan and performed by staff on a scheduled basis.

Achieve Cooling Tower Water Savings – For larger office buildings with chillers, cooling towers are an essential piece of equipment; they reject (i.e., remove) undesired heat that is created as a byproduct of conditioning a building. Cooling towers remove heat by evaporating hot water to the atmosphere; therefore, the more efficiently a cooling tower operates (minimizing the amount of water evaporated), the more water is saved by the building. Mechanical control solutions, such as variable frequency drives (VFDs) for the cooling tower fans, optimize the heat rejection of the cooling tower and minimize the amount of water lost to evaporation. Chemical build-up can occur in cooling tower water, and when this happens the water must be replaced to avoid blocking water pipes or causing corrosion; this can result in large amounts of water being wasted. Maintenance strategies, such as water blowdown optimization and water treatment, minimize the build-up of minerals and therefore reduce the amount of water used by the system.

Use a BAS – As described in the Energy Conservation Measures section of Chapter 3, a BAS centralizes the operation of building systems through the use of sensors and controls, providing greater monitoring capabilities and optimizing equipment performance. In addition to the described energy-saving functions, a BAS can save water by tracking historical water use through equipment flow meters. This tracking can identify water leaks and other usage anomalies, as well as opportunities to reduce usage based on consumption patterns.

Xeriscape and Landscaping Techniques

Many tribal areas frequently experience water shortages. Xeriscape techniques, and other landscaping or gardening techniques, can help reduce or eliminate the need for irrigation. Landscaping with plant species compatible with the local climate minimizes maintenance and water costs. Planting native, drought-resistant plants can eliminate the need for any form of irrigation system, and the plants will rely solely of naturally occurring rainwater. These plants are watered regularly for six months and once established, are watered only when necessary during extended droughts. If an irrigation system is still required, a drip-irrigation system provides the most efficient delivery of water to the landscape. Drip irrigation can be used to cover a large area, or target specific plants or trees. Delivery of water directly to the plant's roots almost eliminates the loss of water due to evaporation.

Feature: Riverside San Bernardino Xeriscape Project

The Riverside-San Bernardino County Indian Health, Inc. provides health services at two locations in San Bernardino and Riverside counties. California is currently in a state-wide drought emergency and the government has released multiple regulations regarding the use of potable water for landscaping. Completely replacing the current landscaping with Xeriscape landscaping at the San Manuel and Soboba Clinics will reduce the potable water usage by 82 percent, exceeding the state regulation by 57 percent. This translates into a water savings of 277,860 gallons per month, or 3,334,320 gallons annually. The project will save $12,296 in annual water costs after the return on investment period of 14.2 years.

A total of 55,100 square feet at two campuses will be replaced with desert compatible plantings that require minimal irrigation. The replacement layer will include compacted rock to replace the grass lawn, and multiple indigenous plants will be planted. This project will also include the installation of low-flow water emitters for the plants at the San Manuel Clinic. These emitters use 0.5 gallons per hour (GPH) of water to allow soils to absorb water more completely into the root zones of plants.

Feature: Kayenta Staff Quarters Greywater Landscaping & Irrigation System

The Kayenta Hospital Staff Quarters, located in Kayenta, AZ, is a new multifamily community serving the Kayenta Health Center staff. The project design integrates the Navajo's cultural concept of healing and home with the natural environment and views of nature, connected neighborhoods to provide a sense of community, parks and open spaces the option of privacy. The project incorporated the *Guiding Principles*; a LEED Gold Certification has been achieved on some of the buildings, with the remainder waiting to be processed. This LEED project is currently pursuing sustainable site credits for Xeriscape and reduced irrigation, as well as water efficiency credits for increased irrigation reductions and very high efficiency water fixtures and fittings installed in each home.

The landscape concept for Kayenta Staff Quarters utilizes natural high desert vegetation that is appropriate for the region along with creating very comfortable neighborhood pods or "nooks" that are shielded from the elements. Fingers of natural vegetation highlight and define the neighborhood pods. These natural areas utilize high desert plant material such as junipers and willow trees, rabbit brush and sage, and a seed mix of wildflowers. The environmentally beneficial landscaping provides natural groundcover that is harmonious to the region, is low-maintenance, and is not dependent on supplemental irrigation. The landscaping also provides safety benefits with the Crime Prevention Through Environmental Design (CPTED), a multi-disciplinary approach to deterring criminal behavior through environmental design. Key features of passive and active security layer strategies include anticipated pedestrian routes, gate control, security cameras, blue light call station, buffer zones, parks, sight lines, etc.

The irrigation for landscaping is provided via a greywater capture system connected to the residential laundry machine in each quarters' unit. Each laundry machine has a greywater drain routed to the exterior where the greywater will discharge to landscaping areas around the units. This greywater system provides approximately 15 gallons per person per day using a standard 40 gallon per load washer. Incoming occupants receive training to learn when they should supply the laundry machine water to the greywater system and when they should discharge it to the sewer. For example, when oily rags are being washed or large amounts of bleach are being used, the laundry machine waters should be discharged to the sewer.

Figure 4-1. Xeriscape and Landscaping Design at Kayenta Staff Quarters

Climate Change Resilience

EO 13653, *Preparing the United States for the Impacts of Climate Change*, outlines Federal agency responsibilities in the areas of supporting climate resilient investment; managing lands and waters for climate preparedness and resilience; providing information, data and tools for climate change preparedness and resilience; and planning.

As part of building efficiency, performance, and management, agencies are directed to incorporate climate-resilient design and management elements into the operation, repair, and renovation of existing agency buildings and the design of new agency buildings. Agencies need also identify and address projected impacts of climate change on mission critical water, energy, communication, and transportation demands and consider those climate impacts in operational preparedness planning for major agency facilities and operations.

The IHS will continue to assess the need for increased health services, public health services, and emergency response; develop guidelines in line with the Secretary's June 2011 Sustainability and Climate Change Adaptation Policy; and assess the feasibility of:

- Integrating climate change and environmental impact considerations into internal management functions and policies
- Collecting, analyzing, and utilizing state of the science data
- Enhancing issue awareness and specialty training for employees
- Leveraging preparedness programs and existing healthy community and climate change initiatives to complement and build upon sustainability initiatives and enhance collaboration with other federal, state, and local agencies and tribal governments

Many existing facilities do not have access to support infrastructures and resources, and need to be prepared for environmental changes. IHS incorporates climate change resiliency design elements into new construction and major renovation projects. The Site Selection Evaluation Process in the A/E Design Guide considers the impact the facility will have on the environment, and the impacts on the environment will have on the structures and occupants. The IHS also considers the potential impact on the social environment, including the local population and existing infrastructure. Many healthcare facilities actively coordinate and cooperate with the local agencies and multiple entities to prepare for climate (and other) events. IHS facilities across the nation are part of the local emergency response networks and involved in healthcare preparedness.

The IHS is also committed to strengthening its external mission, programs, policies, and operations to incentivize planning for, and addressing the impacts of, climate change. This Sustainability Progress Report is an example of one of the many public outreach tools used to explain how the IHS is addressing the impacts of climate change and encouraging further planning.

5. GET INVOLVED!

The IHS continued to engage in several outreach and communication initiatives in fiscal years 2014 and 2015. Key sustainability initiatives included revamping the Sustainability Website, hosting Sustainability Webinars, and posting Green Tips that staff can easily implement to increase sustainability in their homes or workplaces.

Sustainability Website

IHS provides information on various sustainability topics on the Sustainability Website, such as:

- An overview of the IHS Sustainability Program, including goals, policies, and sustainability-re lated documents
- Webpages by topic to explore further – Energy Management; Electronics Stewardship; Pollution Prevention; Sustainable Acquisitions; Sustainable Buildings; Sustainable Communities; Water Conservation
- Green Tips to raise awareness on various sustainability issues, and provide tips that staff can implement at home or in the workplace at little or no cost
- Leveraging preparedness programs and existing healthy community and climate change initiatives to complement and build upon sustainability initiatives and enhance collaboration with other federal, state, and local agencies and tribal governments
- An archive of past Sustainability Annual Progress Reports
- A webpage recognizing IHS recipients of the DHHS Green Champions Awards
- Access to Sustainability Webinar Series
- Contact information for IHS staff for support and information regarding specific focus area

Visit the **IHS Sustainability Website** at: https://www.ihs.gov/sustainability/

Green Tips

Green tips are periodically posted to the Sustainability Website to raise awareness on various sustainability issues, and provide tips that staff can implement at home or in the workplace at little or no cost. Example Green Tips are shown below and on the opposite page.

GO GREEN IN 2015

Every individual has a responsibility to do their part in caring for the environment. This year, resolve to make one simple change at home or at work. For example:

- Bring reusable bags to the supermarket. Keep extras in your car, purse, or briefcase.
- Wash your clothes in cold instead of hot/warm water.
- Turn off lights when you leave a room or your desk/office for the day.

For more ideas on how to Go Green in 2015, go to: http://www.ihs.gov/sustainability/index.cfm?module=dsp_evss_whatcanido

Figure 5-1. Example Green Tip - Go Green in 2015

Figure 5-2. Example Green Tip - Fix Your Faucet!

Sustainability Webinar Series

In FY 2014 and FY 2015, IHS continued to sponsor a Sustainability Webinar Series hosted by the IHS Environmental Health Support Center (EHSC). The webinar provides a forum to discuss sustainable innovations and learn about best practices implemented by IHS and other agencies. All webinars are recorded and available on the Sustainability Website. Tables 5-1 and 5-2 briefly describe webinars in FY 2014 and FY 2015, respectively.

Table 5-1. FY 2014 Sustainability Webinar Series

Date	Presenter	Webinar
July 2014	James Laurenson, FDA toxicologist	*Pharmaceuticals in the Environment*: The Federal Drug Administration (FDA) Center for Drug Evaluation and Research (CDER) Environmental Assessment program has responded to recent increases in scientific data and public interest regarding pharmaceuticals in the environment. While CDER's mandate for drug approval and other actions only requires consideration (as opposed to mitigation) of environmental impacts, CDER has embraced a leadership position as an environmental steward. The webinar addressed sustainable opportunities such as pharmaceutical-related pollution prevention; source reduction; environmental compliance; outreach and communications; and research. The webinar also detailed how these low-cost environmental stewardship efforts would translate into benefits such as reductions in toxicity to aquatic species and potential risks to humans from pharmaceuticals approved and marketed in the US.
August 2014	David Bales, IHS	*What Facilities Need to Know about Pharmaceutical Waste Compliance:* With the growing concern of pharmaceutical waste contaminating the environment, regulatory oversight of its disposal has increased. Does your facility manage pharmaceutical waste properly? This presentation explained the steps to successfully implement a pharmaceutical waste program, and the collaboration needed from pharmacy, nursing, administration, safety and emergency management.
December 2014	Joe Bermes and Michael Young, IHS	*Striving for Net-Zero Energy Consumption in IHS Staff Quarters:* An investigation into the feasibility of achieving net-zero energy consumption in IHS Staff Quarters through the use of on-site photovoltaic renewable energy systems coupled with advanced materials, ground-source heat pumps and solar hot water heaters.

Table 5-2. FY 2015 Sustainability Webinar Series

Date	Presenter	Webinar
March 2015	Katana Jackson, IHS and Seth Marcus, HRSA	*Paper Recycling and Consumption:* In Part 1, Doesn't Need Shred? Recycle Instead, Katana Jackson, an Honorable Mention for the 2012 Green Champions – Environmental Stewardship, provided details on the paper recycling program she developed and implemented for the Kyle Health Center. In Part 2, Reducing Paper Consumption, Seth Marcus (HRSA) described three significant actions taken during 2012 to reduce paper consumption in the National Practitioner Data Bank program, and the results of these actions.
July 2015	Gary Carter and Brian Hroch, IHS	*Amalgam Management in Dental Clinics:* Described amalgam use in dental clinics and presented strategies and best management practices to address resultant challenges. Content covered mercury contamination issues, health effects, and practices to control contamination and exposure.

Green Champions Awards Program

DHHS created the Green Champion Awards Program to award Operational Division staff for their sustainability-related work. 2014 and 2015 Green Champion Award Winners from IHS are presented in Tables 5-3 and 5-4, respectively, and can also be found on the Sustainability Website at: https://www.ihs.gov/sustainability/sustainabilityinaction/

Table 5-3. FY 2014 Green Champion Award Winners

Award	IHS Winner	Details and Location of Winner
Sustainable Design & Facilities Award	Kayenta Staff Quarters – CDR Michael Young, CDR Stephen Christopher	The Kayenta Staff Quarters is a housing project of 129 single family, multi-family, and transient units to support the recruitment and retention of health care staff serving the new Kayenta Health Care Center on the Navajo Reservation in Kayenta, Arizona. CDR Stephen Christopher serves as the Project Manager and CDR Michael Young as the Sustainability Coordinator on the project. The two carefully crafted a design and construction scope of work that ensures the project not only meets federal sustainability standards, but exceeds them where possible. The Kayenta Staff Quarters project fully incorporates the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)* via the Architect/Engineering (A/E) Design Guide, as well as goals established under EO 13514. In addition, it will be the first IHS project to be certified under the Leadership in Energy and Environmental Design (LEED) for Homes v3 template and is expected to achieve a LEED Gold certification. Several innovations incorporated into the project may be useful for consideration and implementation in future projects, including solar hot water heating for domestic hot water load and supplemental heating; exterior building envelope to prevent air from infiltrating into the building and maximize thermal performance; and laundry greywater system to divert laundry wastewater for landscaping irrigation and reduce the load on the public sewer system.
Water Use Efficiency and Management Award	Alaska Native Tribal Health Consortium's Rural Energy Initiative (ANTHC's REI): Chong Park, Ph.D, PE David Reed, PE LT Praveen K.C., PE Christopher Mercer Kolt Garvey Carl Remley	Remote communities in rural Alaska face some of the highest energy costs in the country, and provision of public sanitation services can comprise up to 30 percent of a community's total operational cost. The US Census Bureau reports that 2010 poverty rates were 28.4 percent for American Indians and Alaska Natives compared to eight percent for the country. High energy costs, coupled with low household income, hinder the ability of many rural Alaskans to afford clean water and benefit from basic sanitation. Lack of in-home piped water and sewer services is directly linked to higher gastric, respiratory and skin infection rates. Through partnerships with Alaska Native communities, funding agencies, and utility companies, ANTHC's REI has developed and implemented "wind to heat" systems. This technology captures unused energy from community wind turbines to heat public water systems – significantly reducing sanitation system energy costs.

Table 5-4. FY 2015 Green Champion Award Winners

Award	IHS Winner	Details and Location of Winner
Environ-mental Stewardship	LTJG Melissa de Vera	LTJG De Vera has taken the initiative to work with the tribes in an area of passion for her: Environmental Stewardship and Sustainability. In Grand Portage, she worked closely with staff to finalize an integrated solid waste management plan with goals outlined for waste reduction and recycling. She also managed a project to complete a study titled, "Using Community-Based Social Marketing to Effectively Increase Student Recycling at the Fond du Lac Tribal and Community College." This study identified barriers and solutions to increase recycling on the tribal campus. In addition, LTJG De Vera is a member of the Bemidji Area Office's "Green Team," which was formed to reduce office waste and greenhouse gas (GHG) emissions; and work toward a more sustainable workplace.
Change Agents	ANTHC's REI: CDR Eric Hanssen, PE Gavin Dixon Tashina Duttle Kevin Ulrich Sharnel Vale Chong Park LT Praveen K.C., PE	The cost of basic sanitation, clean water, heating fuel and energy can easily consume half or more of a family's income in rural Alaska, creating barriers to economic development. The ANTHC's REI works specifically to reduce that cost by identifying and implementing energy efficiency and renewable solutions. Through partnerships with rural communities, funding agencies and utility companies, ANTHC's REI developed community wide biomass boiler projects that utilize cordwood boiler systems to provide heat to public water systems, washeterias/water treatment plants, clinics, and community buildings. In 2015, three biomass projects were constructed in the communities of Hughes, Kobuk and Koyukuk with another biomass system in Anvik currently in the design phase. ANTHC's REI is also actively working with a biomass boiler manufacturer on a module that may make energy saving benefits a reality for many more rural communities, where the economics of constructing the system are currently not feasible.
Sustainable Design	CDR Frank Chua	Frank Chua was assigned to replace the demolished housekeeping storage room and current housekeeping office with a more efficient building at the Sells Hospital. The Sells Hospital Housekeeping building has been designed and constructed to use approximately one-third the energy of a typical building of its size in a desert climate. The Housekeeping building will use an energy efficient design and products for all building components to ensure the lowest electricity use possible in the hot and dry climate. The super-efficient building will serve as a dummy to see how the design would increase typical costs, and to demonstrate efficient building design for future projects.

FY 2015 Green Champion Award Winners (Continued)

Award	IHS Winner	Details and Location of Winner
Water Use Efficiency	Darren Ausdemore Juliane Junes-Harvey Kenneth J. Fitzgerald Eric Matson	A comprehensive water master plan completed by Phoenix Area engineers proposed combining two separate public water systems separated by a major river, both with high arsenic levels, into a single public water system. One of the systems had nearly three times the amount of arsenic levels than the other. The proposed solution accepted by the Nation involves construction of an encased High-Density Polyethylene (HDPE) line underneath a major river that connects the two systems together. The completed project will eliminate operation of a high level arsenic water well and an adsorptive arsenic removal treatment plant, resulting in Operation and Maintenance (O&M) savings to the Nation of about $150,000 per year. The construction of the project started in October 2015 with a completion date of spring 2016. This combined water system will reduce electricity usage, provide for a single point of entry for easier utility management, a smaller land blueprint, and provide a more sustainable system for the Nation.
Water Use Efficiency	CDR Hugo Gonzalez	CDR Hugo Gonzalez helped successfully implement energy cost saving projects at the 106,708 GSF Claremore Indian Hospital built in 1977. The new tankless water heater now delivers instantaneous hot water for the Claremore Indian Hospital without the need to store hot water in two 500 gallon tanks that were heated by continuous steam. This implementation has lowered operating costs 25 percent, reduced gas consumption by 18 percent (161 million British thermal units [MMBtu] per year), and costs by $6,291 per year.

GLOSSARY

Alternative Energy – Energy generated from technologies and approaches that advance renewable heat sources, including biomass, solar thermal, geothermal, waste heat, and renewable combined heat and power processes; combined heat and power; small modular nuclear reactor technologies; fuel cell energy systems; and energy generation, where active capture and storage of carbon dioxide emissions associated with that energy generation is verified.

Building Automation System – Computer networking of electronic devices designed to monitor and control the mechanical, security, fire and flood safety, lighting (especially emergency lighting), HVAC, and humidity control and ventilation systems in a building.

Building Envelope – The physical separators between the conditioned and unconditioned environment of a building, including the resistance to air, water, heat, light, and noise transfer. Upgrades to a building's outer shell would facilitate climate control to maintain a dry, heated or cooled indoor environment.

Building Information Model – A digital representation of physical and functional characteristics of a facility. Serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life cycle from inception onward. A primary goal is to eliminate re-gathering or reformatting of facility information; which is wasteful.

Clean Energy – Renewable electric energy and alternative energy.

Climate Resilient Design – To design assets to prepare for, withstand, respond to, or quickly recover from disruptions due to severe weather events and climate change for the intended life of the asset.

Energy Conservation Measure (ECM) – Any type of project conducted or technology implemented to reduce the consumption of energy in a building.

Greenhouse Gases – Gases in Earth's atmosphere that trap solar radiation, preventing heat from escaping into space. The six key GHGs in the atmosphere that threaten the public health and welfare of current and future generations include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Note: EO 13693 adds a seventh GHG, nitrogen trifluoride (NF_3).

Greywater – Wastewater generated from on-site sinks, showers and baths, and washing machines, which can be recycled for certain activities such as toilet flushing, dust control, and landscape irrigation.

Ground Source Heat Pumps – A central building heating and/or cooling system that takes advantage of the relatively constant year-round ground temperature to pump heat to or from the ground.

Light-Emitting Diode (LED) – A type of lighting that uses less energy than most other types of lighting; lasts longer (which means less frequent replacement and therefore reduced waste), is mercury-free, and can be housed in special luminaires designed for easier disassembly and recycling.

Net-Zero Energy Building (ZEB) – A building that is designed, constructed, or renovated and operated such that the actual annual source energy consumption is balanced by on-site renewable energy.

Renewable Electric Energy – Energy produced by solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, geothermal heat pumps, microturbines, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.

Renewable Energy Certificate – A tradable environmental commodity that represents the added value, environmental benefits, and cost of renewable energy above conventional methods of producing electricity, or that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource. A REC counts towards IHS's renewable energy target.

Simple Payback Method – Frequently used to determine how long it would take for a piece of equipment to "pay for itself" through saved costs. The payback time is calculated by dividing the total initial capital cost by total annual savings. Simple payback method does not account for tax incentives, inflation, or ongoing maintenance.

Sustainability – Creates and maintains the conditions under which humans and nature can exist in productive harmony, fulfilling social, economic, and other requirements of present and future generations. Sustainability is important to making sure that we have and will continue to have, the water, materials, and resources to protect human health and our environment.

Underground Storage Tank – Underground tanks storing petroleum or hazardous substances. The greatest potential threat from a leaking UST is contamination of groundwater, a source of drinking water.

Variable Frequency Drive – A device that controls the voltage and frequency that is being supplied to a motor and therefore controls the speed of the motor and the system it is driving. By meeting the required process demands, the system efficiency is improved.

Water Conservation Measure (WCM) – Any type of project conducted or technology implemented to reduce the consumption of water in a building.

http://www.ihs.gov/sustainability/