INDIAN HEALTH SERVICE

2013 Sustainability Annual Progress Report

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

ACL	Acoma-Canoncito-Laguna
ANTHC	Alaska Native Tribal Health Consortium
ASHRAE	American Society for Heating, Refrigerating, and Air Conditioning Engineers
AST	Above ground Storage Tank
A/E	Architect/engineer
A/E Design Guide	Architectural/Engineering Design Guide
BAS	Building Automation Systems
BIM	Building Information Modeling
Btu	British thermal units
CDC	Centers for Disease Control and Prevention
CEQ	Council on Environmental Quality
DDC	Direct Digital Control
DES	Division of Engineering Services
DHHS	Department of Health and Human Services
DOE	Department of Energy
ECM	Energy Conservation Measures
EHSC	Environmental Health Support Center
EISA	Energy Independence and Security Act
EMS	Environmental Management Systems
EO	Executive Order
EPA	Environmental Protection Agency
ESC	Environmental Steering Committee
FY	Fiscal Year
Gal	Gallons
GHG	Greenhouse Gas
gsf	Gross square feet
GSHP	Ground Source Heat Pumps
Guiding Principles	Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings
HVAC	Heating, ventilation, and air conditioning
IHS	Indian Health Service
IPMP	Integrated Pest Management Plan
ISO	International Organization for Standardization
kW	Kilowatt
kWh	Kilowatt hours
LED	Light-emitting Diode
LEED	Leadership in Energy and Environmental Design
MMBtu	Million British thermal units
MVMIS	Motor Vehicle Management Information System
NC	New Construction
OEHE	Office of Environmental Health and Engineering
OMB	Office of Management and Budget
PIMC	Phoenix Indian Medical Center
PUC	Public Utilities Commission
PV	Photovoltaic
REC	Renewable Energy Certificate
SAB	Sustainability Advisory Board
SIP	Sustainability Implementation Plan
SSPP	Strategic Sustainability Performance Plan
T&D	Transmission and Distribution
USPS	United States Postal Service
UST	Underground Storage Tank
VFD	Variable Frequency Drive
WCM	Water Conservation Measures
ZEB	Zero-Energy Building

MESSAGE FROM CHIEF SUSTAINABILITY OFFICER, GARY HARTZ

Welcome to the Indian Health Service (IHS) fiscal year (FY) 2013 Sustainability Annual Progress Report. This is the third annual 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.

This report explores the steps IHS has taken to conserve resources, implement sustainable practices into standard agency operations, and establish itself as a good steward of the environment. It highlights exemplary IHS projects pursued throughout the year, including conducting Sustainability Audits; an IHS Recycling Guidance document; a feasibility study on net zero-energy buildings; success in green purchasing; and a recently approved solar project. The report also acknowledges IHS 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.

While various EOs, environmental regulations, and policies guide how we implement sustainability strategies; 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. It therefore brings me great pleasure to share with you the efforts being done at every level, from grassroots to Headquarters, in hopes that you too will be inspired to join us in our goal to carry out the IHS Mission while simultaneously operating in harmony with the planet that sustains us.

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

1. WHAT IS SUSTAINABILITY?

Sustainability focuses on:

- Reducing energy;
- Conserving water;
- Minimizing waste;
- Purchasing environmentally preferable products and services;
- Implementing environmentally-responsible building practices; and
- Changing individual behaviors in order to protect the environment for ourselves and future generations.

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.

Federal Regulations on Sustainability

The implementation of sustainable practices at IHS is shaped by federal laws and regulations. Executive Order (EO) 13514, "Federal Leadership in Environmental, Energy, and Economic Performance" establishes sustainability goals, targets and requirements for federal agencies. It builds on, but does not replace, EO 13423, "Strengthening Federal Environmental, Energy, and Transportation Management." Other federal sustainability goals and objectives come from the Energy Independence and Security Act of 2007 (commonly known as "EISA 2007") and the Energy Policy Act of 2005 (commonly known as "EPAct").

Technical Resources for Sustainability

The *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (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; and
- Reduce environmental impact of materials.

Additional Guidelines and Resources

The IHS Office of Environmental Health and Engineering (OEHE) Architectural/Engineering Design Guide (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. This 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." The A/E Design Guide incorporates the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles)* and aspects of the Leadership in Energy and Environmental Design (LEED) certification program, described on the next page.

In FY 2013, several additions and modifications were made to Chapter 5, "Sustainability," in the A/E Design Guide. Some of these updates include the following:

- A requirement for the architect/engineer (A/E) to establish an energy benchmarking tool using ENERGY STAR® Portfolio Manager and to train operation and maintenance staff to use the tool;
- Prohibition of the use of potable water for landscaping;
- A new requirement to use Environmental Protection Agency WaterSense-labeled products, where available; and
- Guidance and requirements for the implementation of Building Information Modeling (BIM) into the design and construction process.

The IHS Architectural/Engineering Design Guide is available at:

http://www.ihs.gov/des/includes/themes/newihstheme/display_objects/documents/AEDesignGuide2013.pdf

The OEHE Technical Handbook is a guidance document intended to support implementation of IHS policy, and to set standards and regulations for all aspects of technical services that IHS provides. The FY 2013 OEHE Technical Handbook included Chapter 75-9 *Prioritization and Funding of Sustainability Activities,* which dictates that the Environmental Steering Committee prioritize sustainability-related projects.

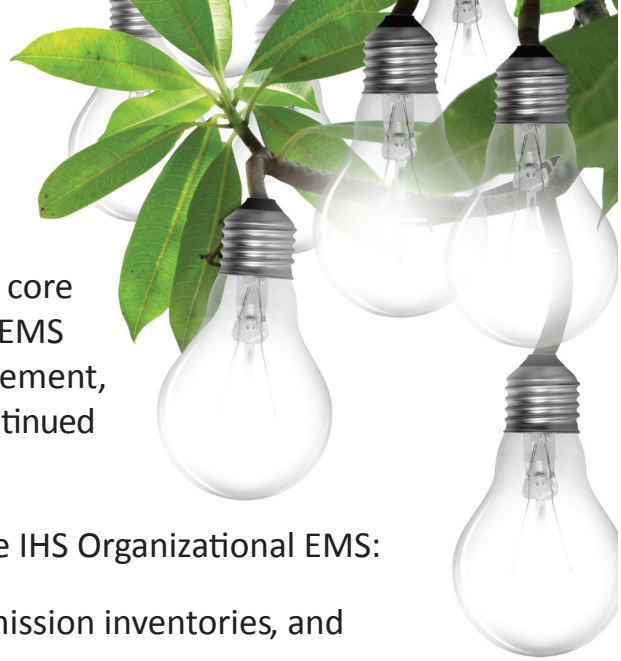
IHS also implements guidelines from the joint Environmental Protection Agency (EPA) and Department of Energy (DOE) ENERGY STAR® program and LEED Green Building Design and Construction. The joint EPA and DOE ENERGY STAR® program provides guidelines for building energy standards. Unlike other similar benchmarking tools, the ENERGY STAR® performance scale accounts for differences in operating conditions, regional weather data, and other important considerations.

To learn about ENERGY STAR Portfolio Manager® visit:

http://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager

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 listed to the right.

- **Sustainable Sites** encourage strategies that minimize the impact on ecosystems
- **Water Efficiency** promotes smarter use of indoor and outdoor water to reduce potable water consumption
- **Energy & Atmosphere** promotes better building energy performance through innovative strategies
- **Materials & Resources** encourages using sustainable building materials and reducing waste
- **Indoor Environmental Quality** promotes better indoor air quality and access to daylight and outside scenery views
- **Innovation in Design** rewards the use of innovative technologies and strategies to improve a building's performance



2. IHS SUSTAINABILITY FRAMEWORK

IHS Organizational Environmental Management System

IHS employs an Organizational Environmental Management System (EMS) that meets the core requirements of the International Organization for Standardization (ISO) 14001 Standard EMS framework. ISO 14001 is a standard that contains criteria including environmental management, legal compliance, and continual environmental improvement in operations. In FY 2013, IHS continued implementation of its Organizational EMS, which encompasses the entire Agency's operations.

This year's Sustainability Annual Progress Report focuses on the following elements of the IHS Organizational EMS:

- Conducting energy and water performance evaluations, greenhouse gas (GHG) emission inventories, and *Guiding Principles* conformance assessments;
- Implementing an environmental policy supporting sustainability;
- Implementing and tracking sustainability goals through the Sustainability Advisory Board (SAB);
- Ensuring all staff receive appropriate environmental training; and
- Communicating EMS activities through the Sustainability Annual Progress Report and other recognition and communication opportunities.

Spotlight on IHS Sustainability Goals and Objective

In FY 2013, IHS sustainability goals and objectives were highlighted in "Healthy Environments/Healthy Communities: The IHS Sustainability Program" of *The IHS Primary Care Provider's* January 2013 edition. *The IHS Primary Care Provider* has also published sustainability-related articles highlighting other agency activities. The purpose of *The IHS Primary Care Provider* is to facilitate communication and share timely information relevant to the clinical practice of IHS, tribal, and urban Indian professional health care providers.

An archive of these publications can be viewed at:

http://www.ihs.gov/provider/index.cfm?module=archived_issues

IHS Sustainability Advisory Board

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

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

The SAB also assists IHS in meeting the DHHS Strategic Sustainability Performance Plan (SSPP) by developing the IHS Sustainability Implementation Plan (SIP) and setting goals and targets that implement IHS environmental sustainability initiatives. During SAB quarterly meetings, members discuss updates from the DHHS sustainability work groups, progress on IHS sustainability goals, current challenges, and all upcoming events and deadlines. The SAB realized many achievements in FY 2013, including strengthening fleet management, pollution prevention, sustainable acquisition, and renewable energy use, which will be described in the following sections.

Environmental Steering Committee

The IHS Environmental Steering Committee (ESC) includes Office of Environmental Health and Engineering (OEHE) staff across the country who review and prioritize funding applications for sustainability (water and energy), environmental remediation, and demolition projects.

In January 2013, OEHE staff updated the OEHE Technical Handbook to include Chapter 75-9 *Prioritization and Funding of Sustainability Activities*, confirming that the ESC prioritizes those project proposals emphasizing sustainable practices. Many of the sustainability projects implement Sustainability Audit recommendations (described in the following section), such as the installation of water and energy meters and energy-efficient lighting upgrades. See *Special Highlight: Red Lake Sustainability Project* on page 14 for a detailed example.

Underground Storage Tanks (USTs) store petroleum or hazardous substances. The greatest potential threat from a leaking UST is contamination of groundwater, a source of drinking water. Learn about EPA's **UST Program In Indian Country** at

http://www.epa.gov/oust/tribes/index.htm

Many of the demolition and environmental remediation projects are funded to properly manage lead, asbestos, and other hazardous materials. Examples including removing Underground Storage Tanks (USTs) that store petroleum or hazardous substances, and replacing with on-site Above ground Storage Tanks (ASTs). The main advantages of ASTs versus USTs include lower installation costs and lower risk of contamination; additionally visual checks for leaks are easier because ASTs are situated in a diked environment or above grade.

Environmental Steering Committee-Funded Projects (2013)

Funded Project	Amount Funded by ESC
Sustainability Projects	
Red Lake Hospital Sustainability Project	$162,600
Photovoltaic Electrical System at Acoma-Canoncito-Laguna (ACL)	$585,000
Xeriscaping at Tuba City	$50,000
Energy Efficient Lighting at Inscription House	$65,000
Yukon Kuskokwim Delta Regional Hospital Energy and Water Meter Installation	$121,000
Environmental Remediation and Demolition Projects	
Environmental Remediation and Demolition of Two Buildings at Fort Peck	$105,000
Environmental Remediation and Demolition at Whiteriver Staff Quarters	$562,000
Environmental Remediation Projects	
Environmental Remediation at Gallup, Fort Wingate, and Tohatchi	$136,000
Replace UST with AST at Dzilth-Na-O-Dith-Hle	$120,000
Kanakanak Erosion Special Study	$90,000
Environmental Assessment of Navajo Nation Buildings	$300,000
Replace UST with AST at Shiprock	$400,000
Site Characterization and Phase I Update at Old Kotzebue Site	$278,000
Demolition Projects	
Demolition of 14 Buildings at Keams Canyon	$220,300
TOTAL	**$3,344,900**

IHS Sustainability Audits

The IHS Sustainability Audits consist of three main components: 1) energy and water performance evaluations, 2) greenhouse gas (GHG) emissions inventories, and 3) High Performance Buildings – *Guiding Principles for Federal Leadership in High Performance Sustainable Buildings (Guiding Principles)* conformance assessments. The following three graphics provide an overview of the relationship between EOs and what actions IHS has taken.

Energy and Water Performance Evaluations

Under EISA, IHS is responsible for completing comprehensive energy and water evaluations of 25 percent of "covered facilities" each year, so that an evaluation is completed once every four years. A "covered facility" may be a group of facilities at a single location or multiple locations managed as an integrated operation. An energy manager is assigned to each "covered facility."

These evaluations were performed on those buildings over 5,000 gross square foot (gsf), since EO 13514 Section 2(g) directs agencies to "…ensure that at least 15 percent of the agency's existing buildings above 5,000 gross square feet meet the Guiding Principles by FY 2015…" Each evaluation included an examination of the entire building's energy-consuming equipment, a lighting review, an inspection of building insulation and the building envelope, studies of building design and drawings, a review of past utility bills to determine billing errors and/or more appropriate billing rates, equipment scheduling analysis, and staff interviews. In addition, water conservation opportunities were also identified (though not required). Auditors then developed and recommended a variety of energy conservation measures (ECMs) and water conservation measures (WCMs) based on the evaluation.

In September 2013, the Office of Environmental Health and Engineering (OEHE) completed comprehensive energy and water evaluations at 27 IHS-owned "covered facilities" as well as eight sites with at least one building more than or equal to 5,000 gsf (though not technically considered a "covered facility" per EISA). A total of 1,284 energy conservation measures (ECMs) and water conservation measures (WCMs) were recommended as a result of these evaluations. The total initial estimated implementation cost is estimated at $51,877,925 and annual savings is projected to be $5,385,487. This yields a simple payback of less than ten years.

Environmental Regulation

The Energy Independence and Security Act (EISA) of 2007 established energy management goals and requirements, focusing specifically on reducing energy intensity.

Goal

Energy and water performance evaluations at all IHS facilities every four years; recommend conservation measures.

Action

Performance evaluation included an examination of energy and water consumption at IHS buildings and facilities.

Result

Completed comprehensive energy and water evaluations at 27 IHS-owned "covered facilities" and eight "non-covered facilities."

Greenhouse Gas Emissions Inventories

EO 13514 directs agencies to develop and report an annual inventory of their various direct and indirect GHG emissions to the Council on Environmental Quality (CEQ) and the Office of Management and Budget (OMB). Using the data collected from the energy and water evaluations, auditors calculated GHG emissions from electricity use, on-site combustion of fossil fuels (e.g., in boilers and emergency generators), IHS-owned vehicles and grounds equipment, refrigerant leaks, and fugitive gases associated with waste disposal. IHS calculated GHG emissions for 116 IHS installations that report energy consumption for buildings of all size.

Environmental Regulation

Executive Order (EO) 13514 directs agencies to develop an annual inventory of GHG emissions.

Goal

Create a baseline inventory of GHG emissions for IHS installations.

Action

Using data collected from energy evaluations, auditors calculated GHG emissions.

Result

GHG emissions inventories of 116 IHS installations were completed.

High Performance Buildings

EO 13514, Section 2(g) directs agencies to "…ensure that at least 15 percent of the agency's existing buildings (above 5,000 gsf) meet the Guiding Principles by FY 2015…" *Guiding Principles* conformance assessments for nearly 2,300 buildings of all sizes were documented using the standardized checklist in ENERGY STAR® Portfolio Manager. Auditors assessed each building's performance in the five *Guiding Principles* topic areas: integrated design, energy consumption, water conservation and protection, indoor environmental quality, and the environmental impact of materials.

Environmental Regulation

EO 13514 directs agencies to conduct conformance assessments with the *Guiding Principles.*

Goal

Determine level of each building's performance in sustainability and improve as needed.

Action

Auditors assessed each building's performance in the five *Guiding Principles* topic areas.

Result

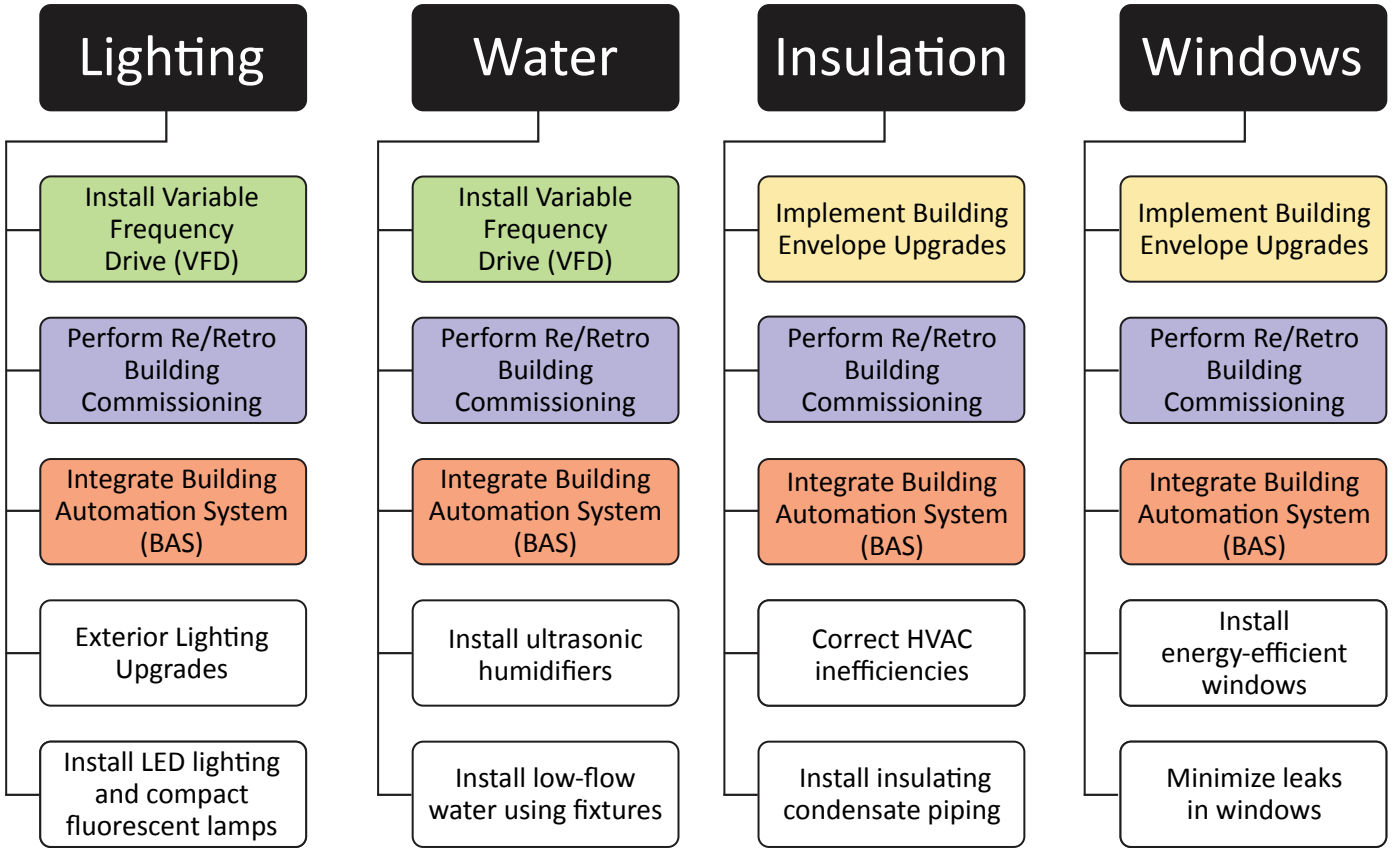
Guiding Principles conformance assessments for nearly 2,300 buildings documented using the standardized checklist in ENERGY STAR® Portfolio Manager.

The final Sustainability Audit reports provided to each facility include details and recommendations specific to that facility. Facility Managers can use these reports to improve preventive maintenance checks, such as utilizing higher efficiency motors, belts, and filters for equipment. Project Managers can also include the recommendations in Scopes of Work for planned projects or in Project Summary Documents to be submitted for Environmental Steering Committee funding.

Overall, IHS Area and facilities staff have found the Sustainability Audit process and reports helpful tools for developing projects and managing resource consumption in their facilities.

Implementing IHS Sustainability Audit Recommendations

The IHS Sustainability Audit recommendations spanned all aspects of a building's operations and structures. Recommended Energy Conservation Measures (ECMs) revolve around lighting, water, insulation and windows. The most common recommendations being implemented at IHS facilities include:



Special Highlight: Red Lake Sustainability Project

In December 2012, Red Lake Hospital was approved for funding by the Environmental Steering Committee to implement recommendations from the Hospital's final Sustainability Audit Report. The Red Lake Hospital has modified its space temperature settings, installed energy-efficient air filters, insulated condensate piping, replaced outdoor lamps with more efficient products, and pressurized the building to eliminate infiltration. The Red Lake Hospital is in the process of installing low-flow aerators, compact fluorescent lamps, and outdoor photocell sensors.

The expected total annual electrical and fuel oil usage will be reduced by approximately 472,550 kilowatt hours (kWh) and 15,800 gallons, respectively. The electrical, oil, and cost savings is estimated at $519,400, with a return on investment of seven years. This project is expected to reduce energy usage by 37,485 British thermal units (Btu) per gross square foot, or 21.9 percent, below FY 2012. The table on the following page summarizes the expected energy savings from the implementation of various energy conservation measures (ECMs).

Picture of the exterior of Red Lake Hospital.

The Red Lake Sustainability Project will save more than $75,000 in annual energy costs.

Red Lake Sustainability Project - Expected Energy Savings

Energy Conservation Measure (ECM)	Annual Electrical Savings (kWh)	Annual Oil Savings (Gal)	Annual Cost Savings ($)	Estimated Project Cost ($)	Simple Payback (years)
Install night setback with optimal start/stop	259,500	9,200	48,000	4,800	0.1
Upgrade kitchen outdoor air control	8,600	2,200	7,800	6,000	0.8
Install ultrasonic humidifiers	6,300	2,800	8,300	100,000	12.0
Install premium-efficiency motors	16,000	0	1,400	6,800	4.9
Install variable frequency drives on air-handling unit converter pumping system	21,100	0	1,800	11,300	5.6
Install high-efficiency transformers	66,600	0	5,800	18,500	3.2
Install steam-to-hot-water heater tank	49,100	1,600	3,500	15,200	4.4
Overall	**427,200**	**15,800**	**76,600**	**162,600**	**7.0**

3. SUSTAINABILITY IN ACTION

Greenhouse Gas Emission Reductions

EO 13514 calls for federal agencies to set targets for GHG emission reductions relative to a 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 IHS, and the transmission and distribution (T&D) 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).

Greenhouse gases (GHGs) – 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), hydro fluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

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

Energy Performance

The IHS building portfolio includes more than six 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 is 199,616 Btu consumed per gross square foot (gsf). In FY 2013, IHS consumed a total of approximately 1,142,300 MMBtu or 195,454 Btu/gsf. This is an overall reduction from the 2003 baseline of 2.1 percent.

IHS reduced overall energy intensity, or energy use per square foot, by 2.1 percent in the last 10 years.

IHS undertook energy improvement projects to achieve this reduction, such as:

- Replacing heating systems with new, higher efficiency systems;
- Replacing residential furnaces in staff housing with ground source heat pumps;
- Replacing chiller plant equipment and other direct-expansion cooling systems with non-chlorofluorocarbon refrigerants; and
- Replacing aged and inoperable utility meters with modern advanced meters that are fully integrated into Area Energy Management Control System networks, including water meters, natural gas meters, and power meters with networked advanced meters.

New chillers at Phoenix Indian Medical Center.

Specific examples include:

- Phoenix Indian Medical Center's new chiller resulted in an overall reduction in electrical consumption, despite added load from a dental building constructed in FY 2013.
- The Hopi Health Care Center realized a reduction in propane use in FY 2013, largely resulting from the replacement of a boiler in FY 2012.
- The electrical consumption of Santa Rosa Health Center in the Tucson Area decreased by about 20 percent due to power from the solar array.

Fleet Management

In FY 2013, 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:

- Reduced petroleum use and increased alternative fuel use in fleet vehicles;
- Enforced IHS-wide use of Motor Vehicle Management Information System (MVMIS) to track fuel and maintenance costs throughout the year;
- Doubled the purchase and use of hybrids, from 25 to 50 since FY 2011; and
- Reduced total miles traveled by carpooling, eliminating trips, and improved scheduling.

Renewable Energy

Renewable energy technologies are considered clean sources of energy and have a much lower environmental impact than conventional energy technologies. Renewable energy, like solar and wind power, is not finite; unlike other sources of energy like fuel oil or natural gas.

IHS advocates for the implementation of renewable energy technology wherever feasible and cost effective. Areas and Installations can apply for funding for such projects via the Environmental Steering Committee (ESC).

In FY 2013, IHS made significant strides to meet the renewable energy target outlined in the IHS Sustainability Implementation Plan (SIP), which states that 7.5 percent of the anticipated electricity use in FY 2013 be attributed to renewable energy. This requirement can be met by either generating renewable energy on site or purchasing it for consumption, including wind, solar, and geothermal. IHS exceeded their renewable energy target: nearly 13 percent of all energy used at the IHS is from renewable energy sources.

Nearly 13 percent of all energy used at the IHS is from renewable energy sources.

The purchase of renewable energy certificates (RECs) helped IHS meet its renewable energy targets in FY 2013. A REC is a tradable environmental commodity that represents the added value, environmental benefits, and cost of renewable energy above conventional methods of producing electricity, namely burning coal and natural gas. The owner of a REC can claim to have purchased renewable energy, providing an easy way to invest in renewable energy without building a separate system.

While RECs represent much of IHS's renewable energy, examples of completed and planned integration of renewable energy are discussed below.

Renewable Energy Certificate (REC) – A tradable environmental commodity that represents the added value, environmental benefits, and cost of renewable energy above conventional methods of producing electricity. A REC is tradable and counts towards IHS's renewable energy target.

Completed Integration of Renewable Energy

- The Santa Rosa Health Center's solar photovoltaic (PV) array produced 155,000 kilowatt hours (kWh) of electricity in FY 2013, or 61 percent of the facility's energy. On weekends the array sent 13,000 kWh of power back to the utility at a payback rate of $0.085 per kWh, resulting in approximately $22,000 worth of savings or credits.
- The recently completed Cheyenne River Health Center and Staff Quarters in Eagle Butte, South Dakota, incorporated the use of ground source heat pumps in its designs.
- Approximately 50 percent of electricity supplied to the grid in the Portland Area comes from hydropower.
- The Bemidji Area utility providers generate approximately 44 percent of their electricity from utility-owned wind farms.

Planned Integration of Renewable Energy

- A 19-kW PV project at the Fort Yuma Hospital's was designed to cover 2.5 percent of energy costs, with funds available for additional photovoltaic (PV) panels.
- A 30-kW PV project at the Southern California Youth Regional Treatment Center in the California Area was designed to cover 7.5 percent of the building's electricity load.
- A 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 Alaska Native Medical Center in Anchorage is exploring the feasibility of using micro-turbine cogeneration.
- The ESC provided funding to Acoma-Canoncito-Laguna (ACL) for a PV electrical system.

Special Highlight: Acoma-Canoncito-Lagunita Hospital Solar Project

Solar panel structures on the roof of ACL.

The Environmental Steering Committee (ESC) provided funding to Acoma-Canoncito-Laguna (ACL) Hospital for a PV electrical system, suggested as an energy conservation measure during the FY 2012 IHS Sustainability Audits. Based on a preliminary estimate of baseline utility usage, the PV system would supply 253,000 kilowatt hours (kWh) of electricity per year. 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.

With panel structures already in place and able to support an array of solar PV panels, this project would reuse the framework of a system; thereby cutting the total initial capital cost. Solar power would provide $47,000 in annual savings at the ACL Hospital. With a total project cost of $585,000, the simple payback is 12.5 years.

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

Current System vs. Solar Power at ACL Hospital

System Design Size	
Current Average Monthly Usage	127,114 kWh
System Monthly Output Design Size	21,075
Percentage of Current Usage	17%
Cost of Power	
Current Average Cost of Power	$0.084/kWh
30 Year Average Cost of Power	$0.196/kWh
Cost of Solar Power	$0.07/kWh
System Cost	
Cost of System	$488,000
Cost of System per Watt	$3.46
Return on Investment	
Pounds of Carbon Avoided each Year	339,803 Pounds per Year
Pounds of Carbon Avoided each Day	931 Pounds per Day
Equal to Trees Planted per Year	373 Trees
Simple Payback	12.5 Years

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 Design Guide (A/E Design Guide), EISA 2007, EPAct, EO 13415, EISA 2007 and the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles).*

Sustainability in Existing Buildings

IHS transforms existing buildings to meet the *Guiding Principles* by evaluating, improving, and documenting each facility's operations and environmental performance against the *Guiding Principles.* The process relies on an integrated and coordinated effort by facility managers, facility operations and maintenance contractors, technical experts, and project managers to:

- Improve energy efficiency;
- Reduce water consumption;
- Enhance stormwater management;
- Test and improve indoor air quality; and
- Standardize and document green operations and maintenance practices.

Most existing buildings were constructed when energy was less expensive, technologies were less advanced, and environmental awareness was less commonplace. Older, existing buildings generally use significantly more energy and water than new buildings of the same size and function. Examples of steps taken by IHS in 2013 to render existing buildings more sustainable include:

- In the **Albuquerque Area,** a renovation project at **Santa Fe Indian Hospital** included replacement of aging ducts, installation of controls, belt replacements, and installation of energy-efficient filters. An old exterior glass door at the Hospital was replaced with an improved energy-efficient model with proper sealing.

Lighting upgrades at the Santa Fe Indian Hospital.

- Also in the **Albuquerque Area,** the roofs and windows on the three **New Sunrise Regional Treatment Center** buildings were replaced with more efficient materials. The project included addressing leaking areas and installing proper sealing techniques. Area-wide direct digital control (DDC) systems were also installed to ensure efficient operations.
- Energy-optimization strategies for **Alaska Area** lighting systems employ sensors, control systems, daylighting, and space optimization. This practice will continue for all applicable Alaska Area projects in the future. The **Yukon-Kuskokwim Delta Regional Hospital** in Bethel, Alaska implemented several ECMs, resulting in a significant drop in the fuel oil usage and associated costs for the facility. These ECMs – all of which use less energy than before implementation – included recycling indoor air, lowering the temperature of water heaters, and correcting dual duct heating, ventilation, and air conditioning (HVAC) box inefficiencies. The facility also developed an LED lighting retrofit project.
- In the **Bemidji Area,** the **Cass Lake Hospital** insulated the maintenance office to reduce the amount of energy and heat loss from the building.
- In developing Scopes of Work, the **Oklahoma Area** incorporates energy-efficient design, sustainable construction siting and materials, renewable energy technologies, and other innovative strategies when feasible. New technologies are implemented within projects to meet or exceed the federal building efficiency standards at every economically feasible opportunity. The **Clinton Indian Health Center** investigated installation of a new DDC system during FY 2013 and plans installation during FY 2014.

New heat pump at the Yakama Health Center will help reduce energy use.

- In the **Portland Area,** the **Yakama Health Center Maintenance Shop** completed a heat pump replacement that will reduce energy use.
- The **Tucson Area Office** changed the windows and lighting systems in two buildings. The Office replaced 40-year old, single-pane and aluminum-frame windows with dual-pane, argon-gas-filled, tinted vinyl windows. Typical fluorescent lights were replaced with light-emitting diode lamps. Personnel immediately noticed an improvement in the level of comfort.

Sustainability in New Buildings

Per EISA 2007, new agency building designs must reduce fossil fuel-generated energy consumption by 65 percent by 2015, compared to an FY 2003 baseline. If life-cycle cost-effective, new buildings must be designed to achieve energy consumption levels that are at least 30 percent below the levels of the ASHRAE Baseline Building (2007).

In 2013 the Division of Engineering Services (DES) managed the design and/or construction of eight energy-efficient health facility projects. All would function more efficiently or more than 30 percent below the ASHRAE Baseline Building (2007).

1. Kayenta Staff Quarters

- Design of 129 units incorporates *Guiding Principles* via A/E Design Guide
- Investigating solar hot water and greywater recycling systems
- Will achieve LEED Silver Certification
- 45 percent more energy efficient than the ASHRAE baseline

Typical Staff Quarters.

2. Southern California Youth Regional Treatment Center

- The first IHS project to incorporate Building Information Modeling
- Will achieve LEED Gold Certification
- 34 percent more energy efficient than the ASHRAE baseline
- 30-kW rooftop PV system (estimated to account for 7.5 percent of annual electrical load)
- Solar hot water heating system
- Investigating use of greywater recycling in toilets
- Established goal to divert 95 percent of construction waste from landfill disposal

Rendering of Southern California Youth Regional Treatment Center.

3. Winslow Indian Health Care Center

- New medical office building will meet the *Guiding Principles*
- 44 percent more energy efficient than the ASHRAE baseline

4. Cheyenne River Staff Quarters

- 133 quarters will be 50-60 percent more energy efficient than the ASHRAE baseline

5. PIMC Southeast Ambulatory Care Center

- 31 percent more efficient than ASHRAE baseline

6. Kayenta Health Center

- Designed to achieve a LEED New Construction (NC) Silver Certification
- Rainwater recovery system includes roof drains tied to underground holding tanks used for irrigation
- Sunshades to diffuse direct light and reduce burden on HVAC system
- 37 percent more efficient than ASHRAE baseline

7. Fort Yuma Health Center

- Designed to achieve a LEED NC Gold Certification
- 52 percent more efficient than ASHRAE baseline

8. San Carlos Health Center

- Construction followed the *Guiding Principles*
- Staff Quarters will achieve LEED for Homes Silver Certification
- 36 percent more efficient than ASHRAE baseline

Sunshades at Kayenta Health Center to reduce burden on HVAC system.

San Carlos Indian Hospital.

Special Highlight: Net-Zero Energy Feasibility Study

Recently passed laws and EOs require federal agencies to dramatically reduce energy consumption in new buildings, achieving Net-Zero energy by the year 2030. For the IHS this requirement will necessitate advanced design efforts and a vigorous analysis of the technologies and associated costs. The purpose of this study is to investigate the current potential to achieve Net-Zero energy in staff quarters through energy modeling of a prototypical staff quarters unit; and then evaluating the systems and related costs to achieve it.

A net zero-energy building (ZEB) is a residential or commercial building with greatly reduced energy needs through efficiency gains such that the balance of energy needs can be supplied with renewable technologies.

Because IHS covers highly variable climate zones, the scope of the study included an analysis of the same staff quarters unit in each climate zone as applicable to each IHS Area. After confirming that the staff quarters unit can be designed and built to exceed the International Energy Conservation Code – 2009 performance by 30 percent, IHS analyzed the potential for PV technology to provide the remaining energy required for an all-electric application. Based on the amount of solar radiation energy available at each site, the study calculated the necessary sizing of the panels in order to generate as much electricity on an annual basis as the staff quarters unit is predicted to demand. The result is a cost per unit, which is converted to a simple payback value, in years. The study shows that current technology can provide sufficient electricity at each site, provided the money is available to pay for the panels. As expected, some areas are much more favorable to achieving the goal of Net-Zero energy than others, as evidenced by a much shorter simple payback. As PV technology improves, the goal of Net-Zero will become much more attainable.

Water Efficiency

The A/E Design Guide and *Guiding Principles* directs 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; and
- Use EPA's WaterSense-labeled products or programs.

Xeriscaping uses landscaping techniques and native plant species to help reduce water use.

Many tribal areas frequently experience water shortages. Area staff use various strategies to minimize the use of water, including rainwater recovery systems to reuse for irrigation; and Xeriscaping – landscaping and gardening techniques that reduce or eliminate the need for irrigation.

Examples of water conservation measures IHS implemented during FY 2013 include:

- The **Oklahoma Area** improved water efficiency by installing low-flow toilets and motion-sensor faucets and upgrading water systems. The **Claremore Indian Hospital** upgraded the steam hot water system. The **Pawnee Indian Health Center** installed variable frequency drives (VFDs) on all pumps.
- The **Nashville Area** implemented water-efficient irrigation techniques, such as the rain-capturing barrels for both indoor and outdoor water systems. The **Unity Healing Center** installed rain barrels to capture rain water for use in garden irrigation and at the sweat lodge.
- The **Bemidji Area** reduced water intensity by approximately 34 percent compared to the FY 2007 baseline, thanks to the installation of water-saving fixtures and utilization of best management practices.
- Installation of advanced water meters will improve the **Great Plains Area's** ability to monitor, evaluate, and report water consumption; improve the water use intensity; and enhance conservation measures.

- The **Albuquerque Area** focused on fixing recurring leaks and installing low-flow devices to reduce water consumption.
- Water-efficient irrigation techniques were also implemented in the **Navajo Area**, such as the underground holding tanks at **Kayenta Health Center**. The recovered water is collected, stored, and used for irrigation.

Underground holding tanks at Kayenta Health Center.

Special Highlight: IHS Recycling Guidance

Recycling is an important component of sustainability because it reduces our impact on the environment, preserves natural resources, and reduces greenhouse gas emissions from waste decomposing in landfills. Many items can be recycled, including paper, plastic, glass, batteries, cardboard, and fluorescent tubes. Composting reduces waste by taking biodegradable or organic materials from the waste stream and breaking down the materials to make nutrient-rich soil.

The IHS Recycling Guidance shares recycling and composting best practices, including step-by-step guidance on developing a facility-based recycling program (See figure to the right for featured steps). The document shares four case studies focusing on successful recycling and composting initiatives implemented in Indian Country.

Steps to develop a facility-based recycling program.

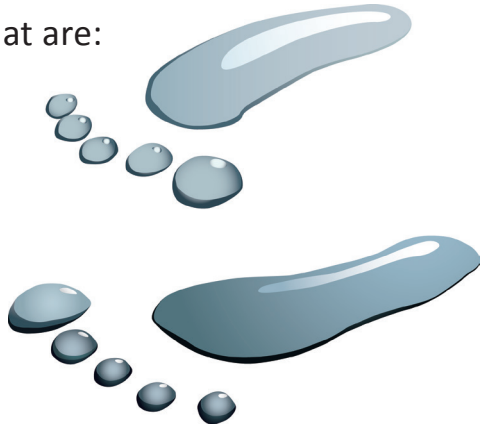
The IHS Recycling Guidance document can also be found online at:

http://www.ihs.gov/sustainability/documents/IHS_RecyclingGuidance.pdf

Sustainable Acquisitions

To improve environmental and human health in IHS facilities, IHS prioritizes products that are:

- Energy-efficient (e.g., ENERGY STAR®-labeled or Federal Energy Management Program-designated);
- Water-efficient (e.g. WaterSense-labeled products);
- Biobased;
- Non-ozone-depleting;
- Recycled-content;
- Non-toxic or less toxic alternatives; and
- Electronic Product Environmental Assessment Tool-registered.



All IHS procurement staff and purchase card holders complete mandatory green procurement training. The most recent quarterly audit reported that 93 percent of eligible purchase actions were in compliance with green purchasing regulations, approaching the 95 percent required by EO 13514. IHS will continue to provide training and outreach to the acquisition workforce to keep them abreast of new green procurement requirements and reinforce existing regulations.

Special Highlight: Green Purchasing at Cheyenne River Health Center

Walter Cournoyer, the Housekeeping Supervisor at Cheyenne River Health Center, buys exclusively green products. “Sustainable acquisition” or “green purchasing” is buying environmentally preferable products and services with less impact on human health and the environment compared to competing or similar products and services.

Mr. Cournoyer purchases environmentally friendly chemicals and cleaners from a green chemicals retailer. He also works to raise awareness and train employees on green purchasing and sustainable practices throughout the facility. Finding green products comparable to less environmentally friendly cleaning products for a health care facility can be very difficult; and has been a challenge in many Areas. An Environmental Committee reviews and approves product choices to guide the green purchasing process.

4. GET INVOLVED!

As part of the Organizational EMS, IHS continued to engage in several outreach and communication initiatives in FY 2013. Key sustainability initiatives included continued development of the Sustainability Website, hosting a Sustainability Webinar series, and gaining recognition for several IHS staff as part of the DHHS Green Champion Awards Program.

Sustainability Website

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

- IHS Sustainability-related goals, policies, and documents;
- Green tips that staff can easily implement to be more sustainable in their homes or workplaces (Example of Green Tip for Earth Day);
- Archive of past IHS Sustainability Annual Progress Reports;
- Web page recognizing IHS recipients of the DHHS Green Champions Award; and
- A forum to announce events and trainings related to sustainability.

Did you know...?

The first Earth Day, on ***April 22, 1970,*** activated **20 million Americans** from all walks of life and is widely credited with launching the modern environmental movement. More than **1 billion people** now participate in Earth Day activities each year, making it the largest civic observance in the world. Learn more at: http://www.earthday.org/earth-day-history-movement

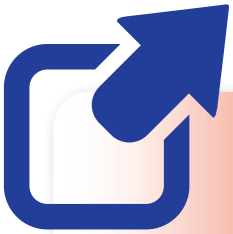
OPDIVs will host their celebrations and additional activities, on different days throughout the month.

Plan your own Earth Day event! Visit: http://www.earth911.com/general/earth-day-activism-tips-from-the-pros/

Example of Green Tip for Earth Day.

Visit the Sustainability Website at:

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

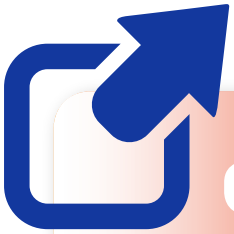


The IHS listserv regularly shares events, trainings, and resources. Sign up for the sustainability listserv at: http://www.ihs.gov/listserv/topics/signup/?list_id=253

Sustainability Webinar Series

In FY 2013 IHS sponsored a Sustainability Webinar series hosted by the IHS Environmental Health Support Center (EHSC). The webinars provide a forum to discuss sustainable innovations and learn about best practices implemented by IHS and other agencies. The following learning objectives provided participants insight into a broad spectrum of sustainability issues:

- Introduce achievable best practices;
- Provide understanding of sustainable practices as it applies to their work;
- Show implementation of sustainable practices;
- Demonstrate community collaboration and the impact of sustainable efforts; and
- Give examples of initiatives displaying the full spectrum of sustainability efforts.



Archived webinars are accessible via the IHS Sustainability Website:
http://www.ihs.gov/sustainability/index.cfm?module=dsp_evss_events_training_webinars
To sign up for upcoming webinars, visit the EHSC Training website at
http://www.ihs.gov/ehsct/index.cfm?module=classes&catID=0

FY 2013 Sustainability Webinar Series

Date	Presenter	Webinar
November	Megan Arndt, IHS	Composting/Food Deserts – Focused on community composting, importance, and availability of fresh local foods.
January	Rob Smith, IHS	ENERGY STAR® Certification – ENERGY STAR Certification at Black Foot Hospital.
March	Holly Thompson, IHS	Integrated Pest Management Program (IPMP) – Process and aspects of IPMP.
May	Mehryar Ebrahimi, CDC	DHHS Green Champion: Data Center Upgrades – Upgrades to computer data centers saves energy.
June	Travis Sorum, IHS	Yurok Tribe Water Treatment Monitoring Project – Upgraded water treatment equipment to improve efficiency.
July	Dianne Shoaf, USPS	Sustainability Hero – U.S. Postal Service Lean Green Team.
September	Chris Couture, IHS	Energy and Sustainability Audits – Conducted audits across IHS and Tribal healthcare systems.
October	Megan Arndt, IHS	Bemidji Community Projects – Composting project.
December	Michelle Watters, CDC	“Don’t Mess with Mercury” Program – Described Center for Disease Control (CDC) program focused on prevention and awareness for children in schools.

DHHS Green Champion Awards Program

DHHS created the Green Champion Awards Program to award Operational Division staff for their sustainability-related work. 2013 Green Champion Award winners from IHS are presented below and can also be found on the Sustainability Website: http://www.ihs.gov/sustainability/index.cfm?module=dsp_evss_whatisihsdoing .

2013 Green Champion Award Winners

Award	IHS Winner	Details and Location of Winner
Change Agents	IHS - Tucson Area SFC	The Tucson Area Sanitation Facilities Construction Branch serves tribal members of the Tohono O'odham Nation with improved individual wastewater disposal systems. These improved systems replaced failed septic systems or pit privies (outhouses). Untreated wastewater polluted the home environment and posed a serious potential public health threat to residents and nearby community members. Since 2008, 84 homes have been served with new wastewater disposal systems as part of an interagency effort to provide modular bathrooms to tribal homes that lack basic sanitation. The outstanding dedication and effort put forth by the technicians and engineers named in this award have had a profound impact in reducing potentially harmful fecal contamination in tribal communities.
Energy & Fleet Management	IHS ANTHC - Rural Energy Health Clinic Retrofits/ARUC Program	A combination of increasing energy costs and shrinking operating budgets is threatening the sustainability of the important healthcare provided at rural health clinics across the state of Alaska. In 2013 ANTHC partnered with local communities and tribal health corporations to develop and implement energy efficiency retrofits at 18 rural health clinics. The energy efficiency upgrades completed by this project are estimated to produce an operational cost savings of $68,000 per year. Most importantly, this project promotes sustainable healthcare infrastructure, lowers the overall cost of healthcare, and leads to healthier rural Alaskan communities.

Award	IHS Winner	Details and Location of Winner
Water Use Efficiency and Management Award	IHS - Turtle Mountain Public Utilities Commission Metering Project	The Turtle Mountain Reservation Public Utilities Commission (PUC) water system provides service to over 12,000 individuals through approximately 2,500 metered connections. Over 1,000 meters on the PUC system were approaching 30 years in age, substantially past their recommended replacement cycle. The Environmental Protection Agency, Indian Health Service, and Bureau of Reclamation funded the replacement of all water meters with magnetic meters and the installation of radio read transmitters. This project was executed in a large part by the cooperation and administrative efforts of the Turtle Mountain PUC staff. The PUC office staff input all the accounts for the new meters in their billing software, and updated water use data for the new system.
Environmental Stewardship	IHS - Spirit Lake Health Center	The Spirit Lake Health Center on the Spirit Lake Indian Reservation strives to practice good environmental stewardship and to protect mother earth, by following a number of sound environmental practices that promote the overall efficiency of the service unit while lessening its environmental impact. This includes utilizing energy-efficient appliances, heating and cooling systems; lighting and reproducing systems; using environmentally-friendly products; and practicing recycling programs for paper, plastic, used copying cartridges; florescent lights, oil and paper. With the support of management, the entire staff of this service unit have formed voluntary programs that promote steps and activities to preserve the environment and conserve our natural resources.
Sustainable Design & Facilities	IHS - Cheyenne River Health Center and Staff Quarters Innovative Energy Savings Design	The Cheyenne River Health Center is approximately 138,000 sf with 10 beds, and started serving patients in January of 2012. The staff quarters (133 units) were completed in phases starting in 2011, and ending in 2013. One of the primary design goals for these facilities was to meet EO 13423 energy standards by targeting a 30 percent energy use reduction from a typical building complying with the ASHRAE standard. Many modern technologies were incorporated, including a high performance building envelope to limit infiltration, thermal insulation exceeding the ASHRAE standard, and advanced networked Digital Demand Controls. The staff quarters design also utilized ground source heat pumps and other innovations resulting in quarters 60 percent more efficient than the prescribed baseline.

Additional Resources

IHS Sustainability Website:
http://www.ihs.gov/sustainability/

The IHS Primary Care Provider:
http://www.ihs.gov/provider/index.cfm?module=archived_issues

IHS Recycling Guidance Document:
http://www.ihs.gov/sustainability/documents/IHS_RecyclingGuidance.pdf

EPA's UST Program In Indian Country:
http://www.epa.gov/oust/tribes/index.htm

IHS Sustainability Listserv:
http://www.ihs.gov/listserv/topics/signup/?list_id=253

Indian Health Service Architectural/Engineering Design Guide:
http://www.ihs.gov/des/includes/themes/newihstheme/display_objects/documents/AEDesignGuide2013.pdf

DHHS Green Champion Awards:
http://www.ihs.gov/sustainability/index.cfm?module=dsp_evss_whatisihsdoing

GLOSSARY

Above ground Storage Tank – Tanks storing petroleum or hazardous substances in a diked environment or above grade.

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 Commissioning – Process to verify a building's subsystems proper operation of mechanical, plumbing, electrical, building envelopes, sustainable systems, lighting, wastewater, etc. Successful building commissioning has the potential to reduce energy usage by 20 percent, otherwise wasted in a poorly operated building system.

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. It 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.

Digital Demand Control – A method of taking information from a throttle (e.g. train controller), having it processed by a command station, which creates a digital packet and passes it to the booster, which amplifies it before sending the digital packet onto the entire track layout.

Discount Rate – The interest rate charged to commercial banks and other depository institutions for loans received from the Federal Reserve Bank's discount window. Also refers to the interest rate used in discounted cash flow (DCF) analysis to determine the present value of future cash flows, taking into account the time value of money and the risk or uncertainty of future cash flows.

Energy Conservation Measures – Any type of project conducted or technology implemented to reduce the consumption on 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), hydro fluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

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 – 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.

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. A REC is tradable and 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. Contrarily, fixed speed motor applications or systems use control elements such as dampers and values to regulate flow and pressure. These devices usually result in inefficient operation and energy loss because of their throttling action.

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

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