Indian Health Service

Sustainability Progress Report
Fiscal Years 2016 and 2017

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Acronyms and Abbreviations

A/E	Architectural/Engineering
ASHRAE	American Society of Heating Refrigerating and Air Conditioning Engineers Standards
BIM	Building Information Modeling
Btu	British Thermal Units
HHS	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 2005	Energy Policy Act of 2005
ESC	Environmental Steering Committee
ESPM	ENERGY STAR Portfolio Manager®
FY	Fiscal Year
GHG	Greenhouse Gas
gsf	Gross Square Feet
Guiding Principles	Guiding Principles for Federal Leadership of 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
MMBtu	Million British Thermal Units
MWh	Megawatt hours
NREL	National Renewable Energy Laboratory
OEHE	Office of Environmental Health and Engineering
OPDIV	Operating Division
PV	Photovoltaic
REC	Renewable Energy Certificate
SAB	Sustainability Advisory Board
SIP	Sustainability Implementation Plan
SSPP	Strategic Sustainability Performance Plan
UESC	Utility Energy Service Contract
WCM	Water Conservation Measure

Message from The Chief Sustainability Officer: Gary Hartz

Welcome to the Indian Health Service 2016-2017 Sustainability Progress Report, which describes the continued actions we have taken in the last two years to conserve resources, implement sustainable practices into standard agency operations, and be a good steward of the environment. This is the fifth report published with the purpose of communicating, externally and internally, the sustainability activities and accomplishments of staff nationwide and at all organizational levels.

The report describes Indian Health Service performance across components of sustainability such as greenhouse gas emissions, energy efficiency, renewable energy, and water conservation. It highlights exemplary federal and tribal projects pursued over the past two years: the construction of Leadership in Energy and Environmental Design®-certified buildings, the installation of a greywater system, and the operation of photovoltaic solar systems. The report also acknowledges Indian Health Service and tribal staff and teams that have received Department of Health and Human Services Green Champion Awards for their noteworthy contributions to sustainability. Lastly, this report maintains accountability and transparency of our impact on the environment and exhibits our efforts to address Presidential Executive Orders regarding environmental sustainability.

Various Executive Orders, environmental regulations, and policies guide how we implement sustainability strategies, but the concept is at the heart of the Indian Health Service Mission – to raise the physical, mental, social, and spiritual health of American Indian and Alaska Natives to the highest 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 health. Our modern history as an environmentally conscious country began in the 1970s. Faced with the consequences of air and water pollution 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 enhance our environment. Today the topic of sustainability has a consistent and important presence in many of our conversations, actions, and policies.

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 ongoing sustainability endeavors where you live and work.

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


"We do not inherit the earth from our ancestors,
we borrow it from our children" - Native American Proverb

Chapter One

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. It is the use of resources at a rate that can be continued indefinitely while supporting ecological balance.

Key practices of sustainability are:

- 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

Left: Navajo Falls on the Havasupai Indian Reservation, Grand Canyon National Park

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 2005) and the *Energy Independence and Security Act of 2007* (EISA 2007).

Released in March of 2015, EO 13693, "Planning for Federal Sustainability in the Next Decade," established a new set of sustainability goals, targets and requirements for federal agencies. EO 13693 established 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 introduced new performance metrics and measures including a clean energy target, which combine renewable electric and alternative energy goals (e.g. geothermal), specific targets for data center energy efficiency, per-mile GHG 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 actions are consistent with sustainability and climate priorities of local authorities. Agencies are 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.

Released in March of 2017, EO 13783, "Promoting Energy Independence and Economic Growth," provided additional guidance regarding agency actions and reporting.

EO 13693 Sustainability Goals:

- GHG Emissions Reduction and Reporting
- Energy Conservation and Renewable Energy
- Green Building Performance
- Water and Stormwater Management
- Fleet Performance
- Employee Commuting and Workplace Travel
- Sustainable Acquisition
- Solid Waste Diversion and Pollution Prevention
- Performance Contracting
- Electronics Stewardship
- Strategic Sustainability Performance Plan

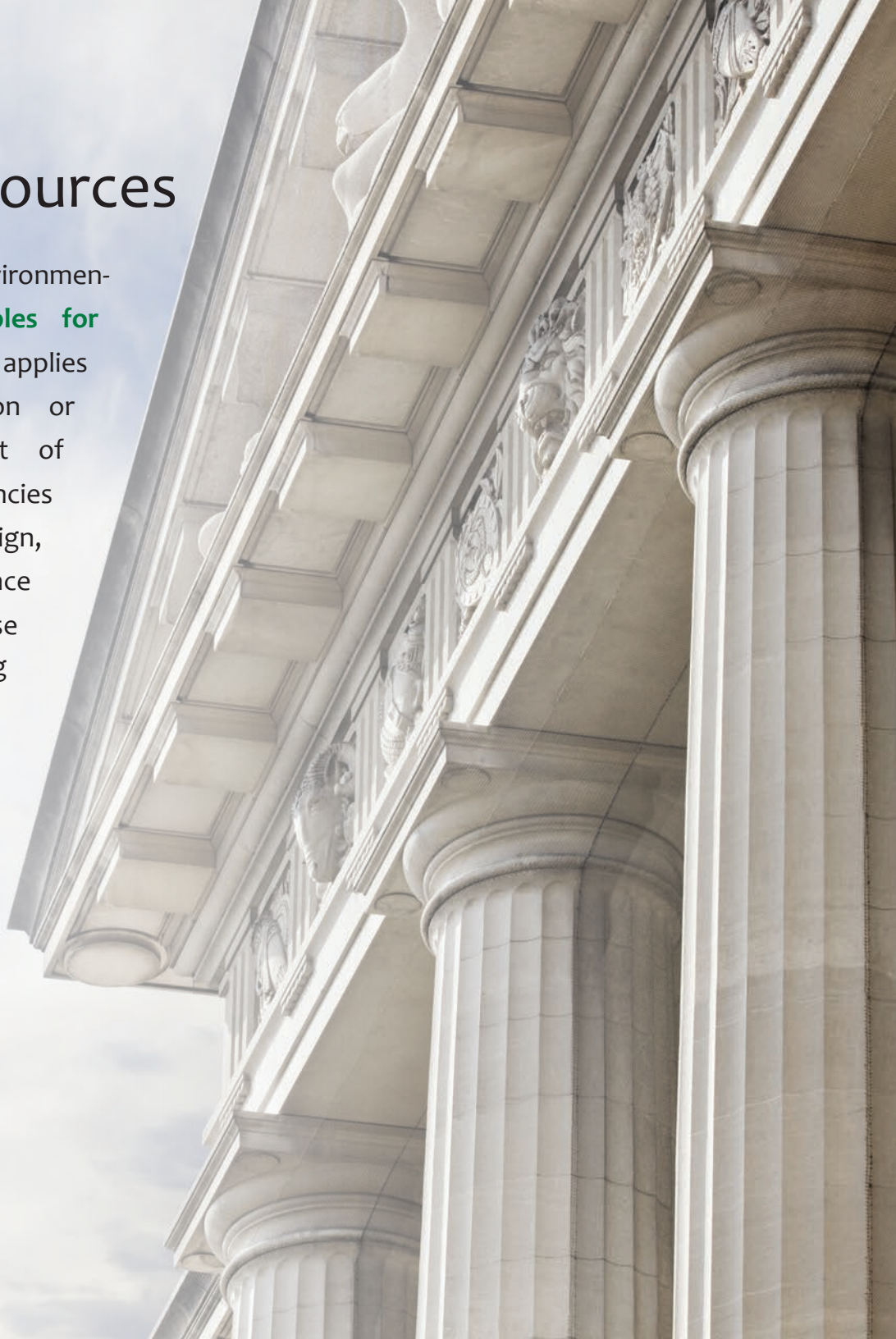
The EO specifically directs Federal Agencies to:

- Ensure 25 percent of their total energy (electric and geothermal) consumption is from clean energy sources by 2025
- Reduce energy use in federal buildings by 2.5 percent per year between 2015 and 2025
- Reduce per-mile GHG emissions from federal fleets by 30 percent from 2014 levels by 2025, and increase the percentage of zero emission and plug-in hybrid vehicles in federal fleets
- Reduce water intensity in federal buildings by 2 percent per year through 2025

Federal Guidelines and Resources

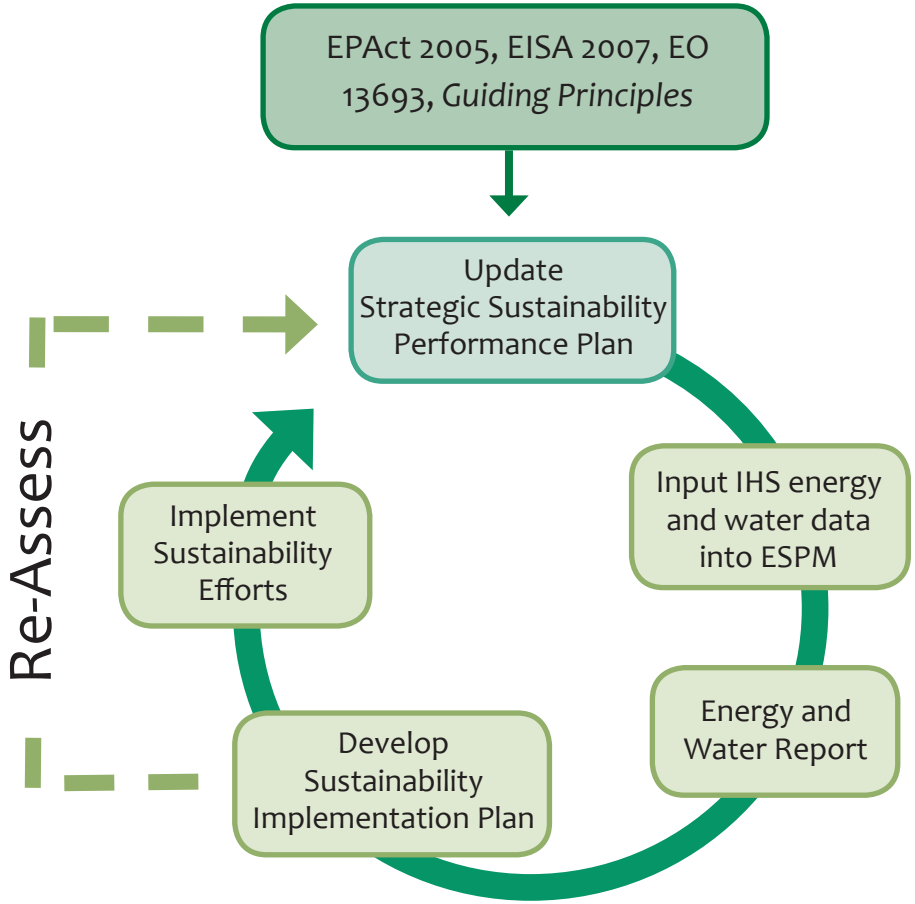
As a result of EO 13693, the Council on Environmental Quality published an updated **Guiding Principles for Sustainable Federal Buildings (2016)**, which applies to both existing buildings and new construction or modernization. The *Guiding Principles* are a set of established criteria that require federal 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 the Environmental Impact of Materials



IHS also follows the Guidelines for Energy Management developed by the joint Environmental Protection Agency (EPA) and Department of Energy 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 that tracks energy and water consumption, as well as GHG emissions; and accounts for differences in operating conditions, changes in regional weather data, and other important considerations. Reporting energy and water consumption in ESPM is particularly useful 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.

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



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 GHG 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 Leadership in Energy and Environmental Design (LEED®) certification program described on the next page. 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.

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.**

Projects earn points across several categories, including energy use and air quality. Based on the number of points achieved, a project then earns one of four LEED rating levels: Certified, Silver, Gold or Platinum.

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. LEED Gold certification is used as a target to create a buffer to ensure that at least LEED Silver certification is achieved.

Figure 1-2. LEED Core Concepts and Strategies

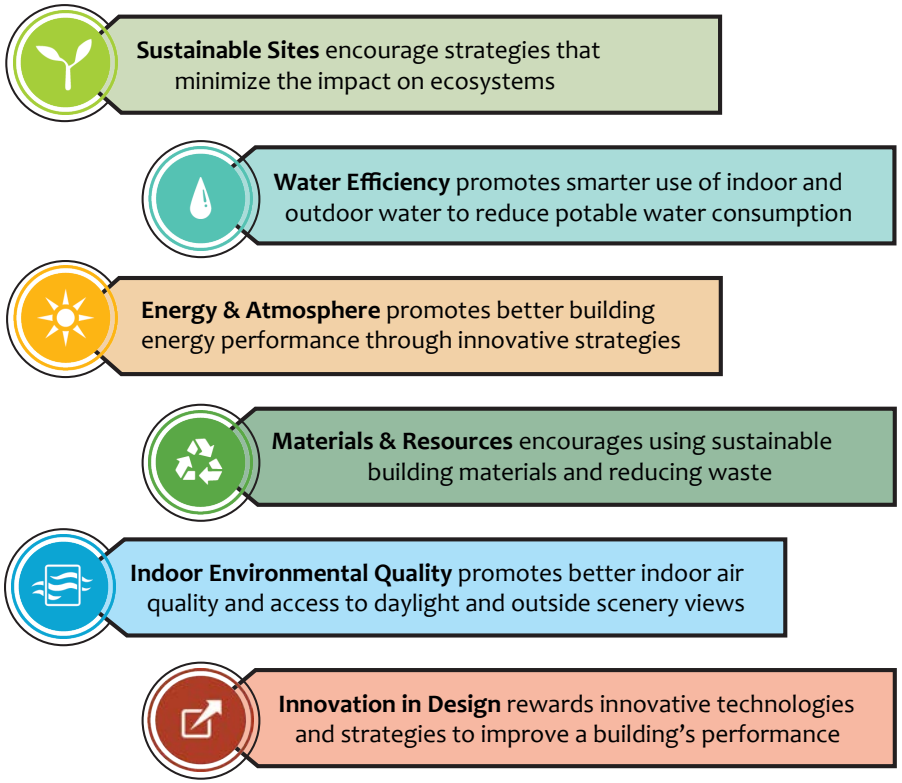


Figure 1-3. LEED Certification Rating Levels

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“When we show respect for other living things, they show respect for us” - Arapaho

Chapter Two

IHS Sustainability Program

The IHS strives to meet all federal requirements and be forward-acting on 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 operational policies and practices, and IHS employee efforts. Environmental concerns are considered at the earliest stage possible by IHS, Contractors, and Suppliers to minimize impact on the environment.

This Progress Report focuses on the following elements of the Sustainability Program during FY 2016 and 2017:

- Implementing energy and water conservation measures
- Implementing and tracking sustainability goals through the SAB

Left: National Bison Range in the Flathead Indian Reservation, Montana

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 the annual Health and Human Services (HHS) SSPP. 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 13693. These 10 goal areas include:

- GHG Emissions 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
- Energy Performance Contracts

Each year, the SIP identifies objectives within each goal area that IHS intends to meet. IHS develops tools and strategies to reach these objectives. The SIP shows and describes agency progress, and identifies hindrances and challenges to progress in each goal area. 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 reviewing body for managing sustainability requirements and providing executive direction. It is made up of representatives from offices throughout IHS and is chaired by the IHS Chief Sustainability Officer Gary Hartz. The Board is chartered to:

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

As described in the previous section, the SAB assists the IHS in meeting the HHS 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 2016 and 2017, 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 IHS Environmental Steering Committee (ESC) includes OEHE staff nationwide that review and fund applications for sustainability, environmental remediation, and demolition projects. For sustainability projects, the ESC approves funding for project proposals that emphasize sustainability improvements for IHS facilities. These projects help IHS meet federal sustainability goals. Many sustainability projects implement recommendations from energy audits such as lighting, water fixture, and heating system upgrades. In addition, the ESC funds installation of renewable energy source projects such as solar and wind generation of electricity.

In FY 2016, the ESC approved $1.4 million for sustainability projects. Lighting and water efficiency upgrades were the most common types of sustainability projects. Upgrades of lighting schemes and controls will save $74,000 per year. Sustainable lighting upgrades are discussed in more detail in Chapter 3.

Table 2-1. FY 2016 Environmental Steering Committee-Funded Projects

Area	Funded Project	Amount Funded by ESC
	Lighting Upgrades	
CA	Chapa-De LED Lighting Retrofit	$133,000
CA	Northern Valley Willows LED Lighting Retrofit	$58,000
CA	Toiyabe LED Lighting Retrofit	$28,500
BI	Poplar Health Center Sustainability LED	$440,000
	TOTAL ESC-FUNDED LIGHTING UPGRADES	**$659,500**
	Recommissioning and Audits	
GP	Winnebago Recommissioning	$48,400
GP	Belcourt Recommissioning	$54,600
GP	Pine Ridge Recommissioning	$42,100
BE	Lac Courte Oreilles Health Clinic Energy Audit	$15,000
BE	Maehnowesekiyah Treatment Energy Audit	$30,000
BE	Mille Lacs Band of Ojibwe Energy Audit-Bldgs (B2930 & B2932)	$20,000
BE	Bad River Health Clinic Energy Audit	$15,000
	TOTAL ESC-FUNDED RECOMMISSIONING AND AUDITS	**$225,100**
	Water Savings	
CA	Riverside San Bernadino Xeriscaping	$87,500
BI	Crow Agency Xeriscape/Rainwater Collection Part 1	$210,000
BI	Blackfeet Hospital Xeriscaping	$236,250
	TOTAL ESC-FUNDED WATER SAVINGS	**$533,750**
	TOTAL 2016 ESC-FUNDED SUSTAINABILITY PROJECTS	**$1,418,350**

Areas: AK - Alaska BE - Bemidji BI - Billings CA - California GP - Great Plains OK - Oklahoma PH - Phoenix PO - Portland

In FY 2017, the ESC approved $2.7 million for sustainability projects. With $900,000 being approved for lighting and water improvements (the most common types of sustainability projects), $1.1 million was approved to support the Phoenix Indian Medical Center Utility Energy Services Contract, a $5.5 million construction value project. The combined total estimated savings in utility costs is projected to be $370,000 per year.

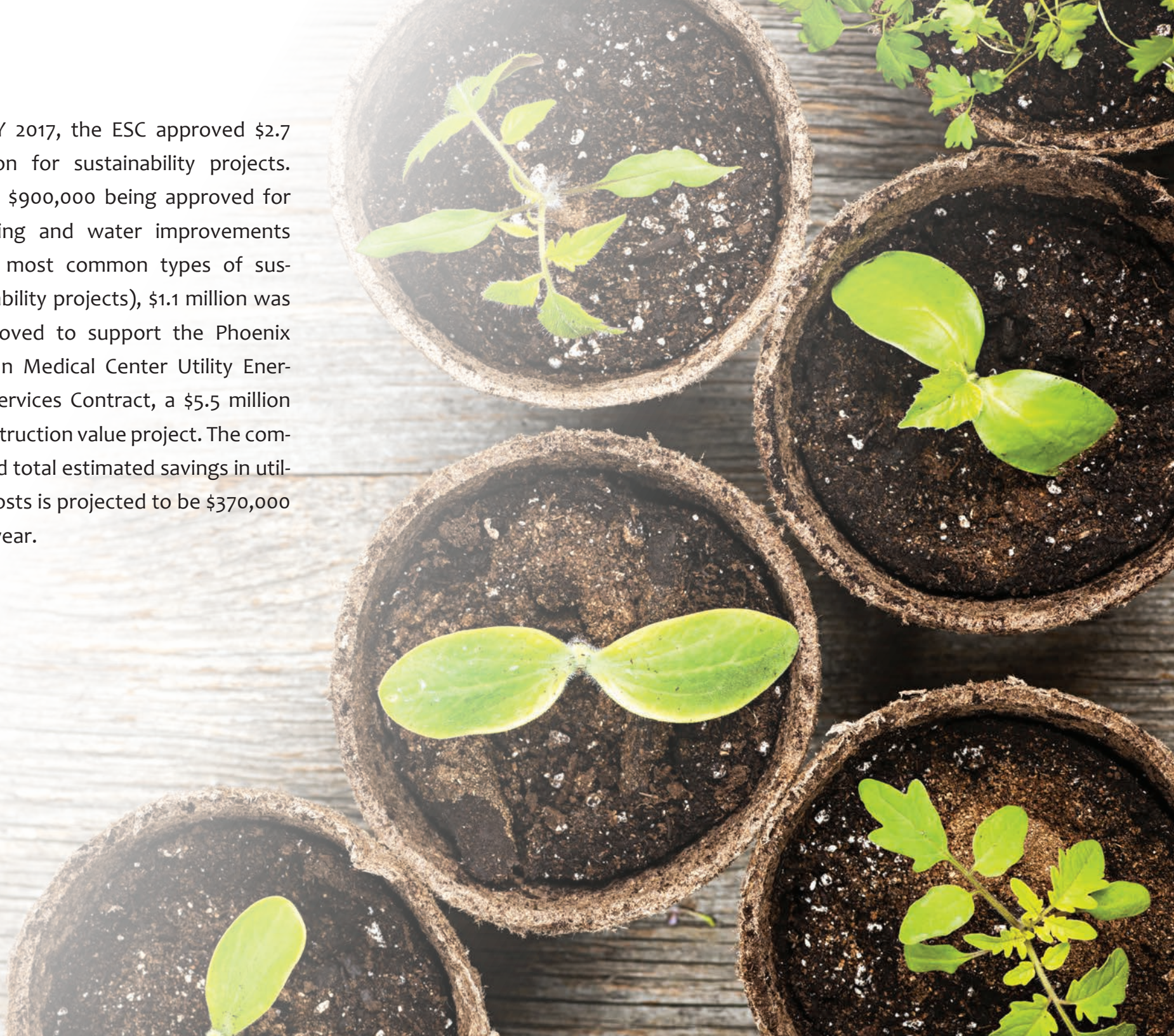
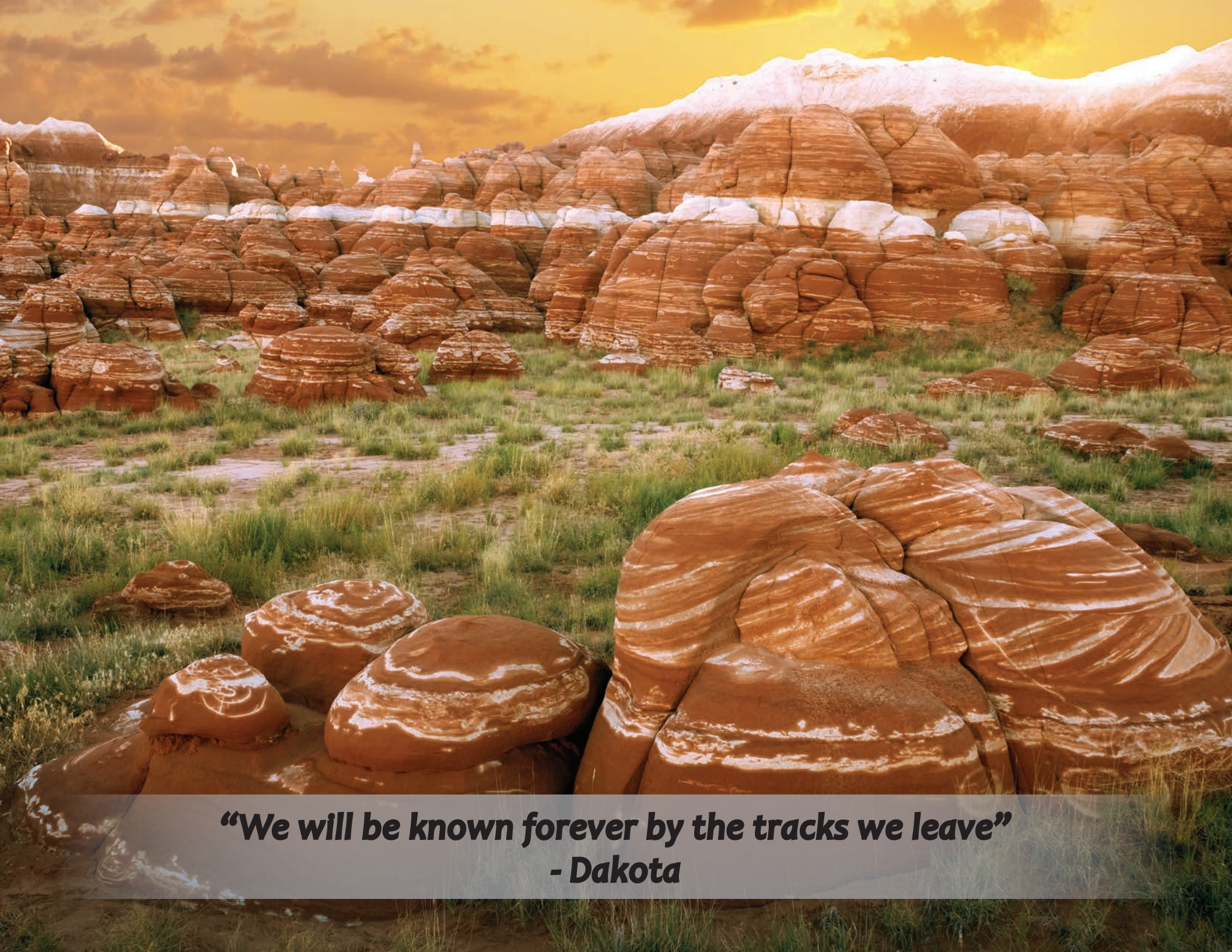


Table 2-2. FY 2017 Environmental Steering Committee-Funded Projects

Area	Funded Project	Amount Funded by ESC
	Lighting Upgrades	
BI	Fort Belknap Lighting Upgrade	$190,000
CA	Northern Valley Indian Health (NVIH) Chico LED Lighting Retrofit	$17,000
PO	Healing Lodge of Seven Nations Lighting Upgrade	$28,500
AK	Southeast Alaska Rural Health Care (SEARCH) St. Paul LED Lighting Upgrade	$104,000
OK	Project Summary Document-Clinton LED Lighting Retrofit	$94,000
	TOTAL ESC-FUNDED LIGHTING UPGRADES	**$433,500**
	Recommissioning and Audits	
GP	Sisseton Recommissioning	$51,000
BE	Sokaogon Sustainability Energy Audit	$15,000
BE	St. Croix Energy Audit	$30,000
	TOTAL ESC-FUNDED RECOMMISSIONING AND AUDITS	**$96,000**
	Water Savings	
BI	Fort Washakie Xeriscaping	$104,000
BI	Crow Agency Xeriscape/Rainwater Collection Part 2	$373,000
	TOTAL ESC-FUNDED WATER SAVINGS	**$477,000**
	Other	
PH	Phoenix Indian Medical Center (PIMC) Utility Energy Service Contract (UESC)	$1,114,000
BE	Cass Lake Hospital PV Solar Project	$150,000
BE	Cass Lake Hospital Geothermal Project	$210,000
BE	Stockbridge Munsee Sustainability Geothermal Upgrade	$192,000
	TOTAL OTHER	**$1,666,000**
	TOTAL 2017 ESC-FUNDED SUSTAINABILITY PROJECTS	**$2,672,500**



"We will be known forever by the tracks we leave"
- Dakota

Chapter Three

Energy Management & Greenhouse Gases

The goal of EO 13693 is to maintain federal leadership in sustainability and GHG emission reductions with annual set targets through FY 2025. The GHG 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, vehicles, and other localized sources. Indirect GHG emissions result from the off-site generation of energy used on-site, i.e. electricity or steam. Other indirect GHG emission sources are neither owned nor directly controlled by IHS, but are related to IHS's activities (e.g., employee travel and commuting, solid waste disposal, and 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.

Left: Blue Canyon in the Hopi Indian Reservation, Arizona

Energy Performance

The IHS building portfolio includes 4.5 million square feet of federally operated space that annually reports energy use. FY 2015 is used as a new baseline for comparison of energy use. In FY 2015, IHS consumed 148.5 thousand Btu (kBtu) consumed per gross square foot (gsf). The measure of kBtu/gsf is known as energy intensity, and is the basis for federal energy reduction goals. In FY 2017, the IHS reported using 112.2 kBtu/gsf, a 24.4 percent reduction in two years. EO 13693 sets a goal of reducing energy intensity by 2.5 percent per year through the end of FY 2025. IHS is well on the way to meeting the 2025 goal of reducing energy intensity by 25 percent.

Table 3-1. Summary of energy consumption from FY 2016-2017 compared to the baseline year (FY 2015)

Fiscal Year (FY)	Energy Intensity (kBtu/gsf)
2015 (Baseline)	148.5
2016	103.7
2017	112.2

The apparent 8.5 kBtu/GSF increase in energy intensity between FY 2016 and 2017 is the result of continuing efforts to improve energy reporting.

Energy Conservation Measures

Over the course of FY 2016 and 2017 the IHS conducted a series of sustainability audits. The resulting reports provided each facility audited with details and specific recommendations regarding energy conservation measures (ECMs) that would improve energy efficiency. Common ECMs being implemented at IHS facilities include lighting upgrades, photovoltaic systems, geothermal energy and daylight design.

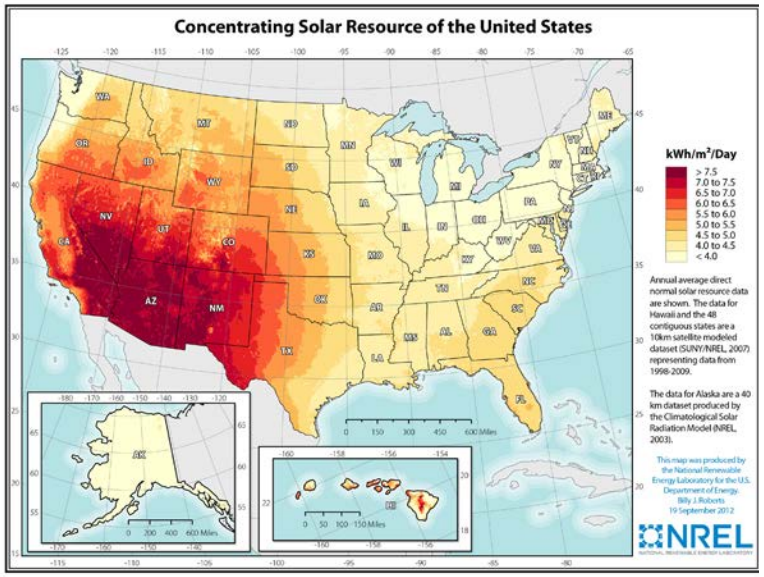
Lighting Upgrades

Lighting consumes about one third of the electricity used in commercial buildings. With the replacement of incandescent light bulbs to energy efficient light-emitting diode (LED) bulbs, as well as improving building design to utilize sunlight, a significant amount of energy can be saved. LED-containing fixtures produce the same amount of light with about one tenth the energy usage. They also use less toxic materials to make and last many times longer. Some lighting systems include occupancy sensors and automatic dimmers.

Photovoltaic (PV) Systems

Also known as solar cells, PV cells convert sunlight directly into electricity. There are several generations of PV systems that differ in size and materials, striving to improve cell efficiency while keeping material cost down. Currently, a typical commercial solar cell has an efficiency of about fifteen percent (one sixth of the sunlight reaching the cell generates electricity). The drawback of solar energy is the inconsistency of sunlight. As a result, areas of the nation that receive more annual sunlight will be more able to take advantage of PV systems.

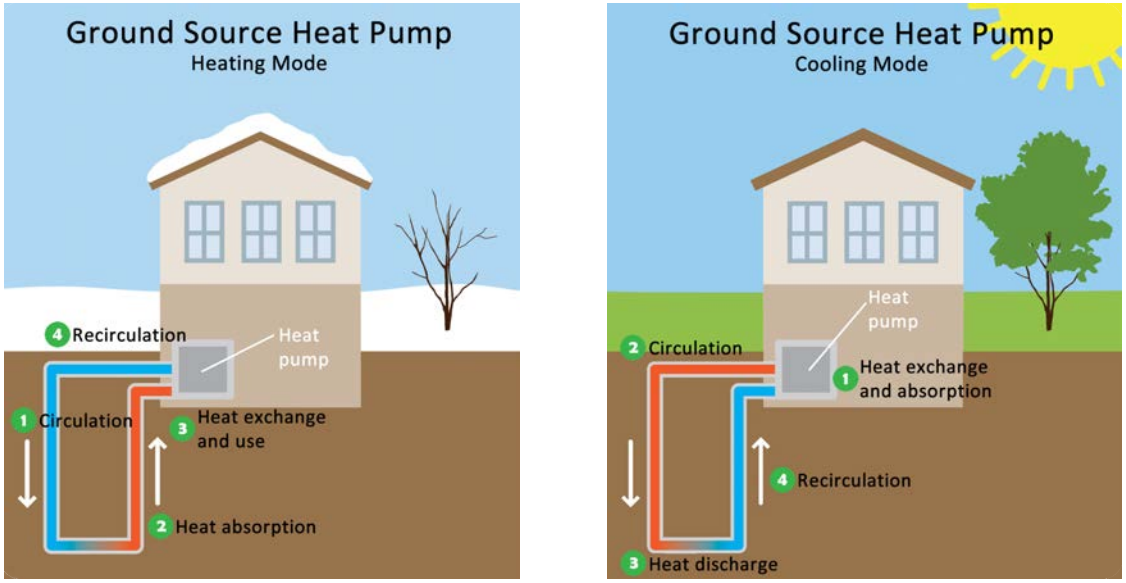
Figure 3-1. Map of Solar Resources in the Continental US (National Renewable Energy Laboratory)



Geothermal Energy

In most places around the world, the earth maintains a temperature between 50 and 60 degrees Fahrenheit ten feet below the surface. A geothermal system uses this resource to heat and cool buildings. A fluid is pumped through buried pipes where it gets heated or cooled by the earth. The fluid is then circulated to a heat pump to warm or cool the air. With varying degrees of efficiency, a large amount of money can be saved, and GHG emissions reduced.

Figure 3-2. Diagram of Ground Source Heat Pump in Heating Mode and Cooling Mode (EPA)



Daylighting Design

Seemingly simple design features of newly constructed facilities contribute to their sustainability without using equipment. Strategically placing windows and skylights as well as the layout of the building allows natural daylight to illuminate rooms so that less electricity is needed to power lighting systems. Designers aim for light distribution and indirect lighting to avoid glare and overheating.

Energy Improvement Projects

Poplar Lighting Upgrade

The Verne E. Gibbs and Chief Redstone Health Centers in Poplar and Wolf Point, Montana upgraded fluorescent and high pressure sodium lights to LEDs in both the interior and exterior buildings. In addition, occupancy sensors for the lighting controls will be installed at various work spaces. The improvements will reduce the electrical consumption.

The electrical savings is calculated to be approximately 371,000 kWh/yr with cost savings estimated to be $37,000 per year. Total payback will take approximately 12 years. This project will assist the Fort Peck Service Unit in becoming compliant with the Federal Sustainability requirements and is anticipated to increase the Existing Building Assessment score by 25 points in the Energy Performance attribute. The initial cost of retrofitting lighting systems at a facility are far outweighed by the energy savings, cost savings, and reduction of man-hours spent on maintenance.

Figure 3-3. Front of the Kayenta Healthcare Center

Kayenta Healthcare Center

This LEED Gold certified facility located in Kayenta, Arizona has numerous sustainability features. Natural daylight windows were a focus to save on energy as well as to present the natural monuments of great beauty and sacred value. Celestory monitors (raised structure with windows shown to the top right above) bring daylight from the east into the high volume Physical Therapy and Wellness gymnasium spaces. The remaining light is provided by LED fixtures.

Desert Sage Youth Wellness Center (A 2016 Green Champion Award winner!)

Located in Hemet, California, this newly built LEED Gold certified treatment center has many sustainable features as well. In particular, the PV system (as seen on the roof below) will generate 24kW of electrical power designed to provide 10 percent of the buildings' annual electrical needs. In addition, the solar hot water heating system was installed to provide 30 percent of the hot water demand for the buildings.

Figure 3-4. Aerial view of the Desert Sage Youth Wellness Center

Renewable Energy and Acquisitions

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. IHS area offices and tribal entities may apply for renewable energy projects to be funded by the ESC. The EO 13693 renewable energy goal is to produce or purchase, in increasing increments, up to 30 percent by 2025.

The purchase of renewable energy certificates (RECs) helped IHS meet its renewable energy targets in FY 2016 and 2017. 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 2016 and 2017, IHS purchased 23,900 (megawatt hours) MWh and 15,000 MWh respectively.

IHS is in the middle of a five-year plan (FY 2015-2019) to purchase RECs through the Defense Logistics Agency. While RECs represent much of IHS's renewable energy use, IHS continues to plan and implement renewable energy projects of its own.

Feature: Kotzebue Hospital Wind-to-Heat Project
(A 2016 Green Champion Award winner!)

The Maniilaq Health Center in Kotzebue, Alaska installed a heat system to reduce energy costs and GHG emissions. Excess wind energy from the Kotzebue Electric Association's 3-megawatt wind turbine farm is directed to a 450-kilowatt electric boiler in the hospital.

In 2012, the hospital spent over $2 million on energy costs and over $1 million alone for fuel oil, consuming approximately 164,000-gallons of fuel oil annually. With the new system, the hospital's heating oil consumption is expected to be cut by 20 percent and will save approximately 32,000 gallons of fuel annually.

The wind farm was created in 1997 and has grown to 19 turbines with continued intention to expand.

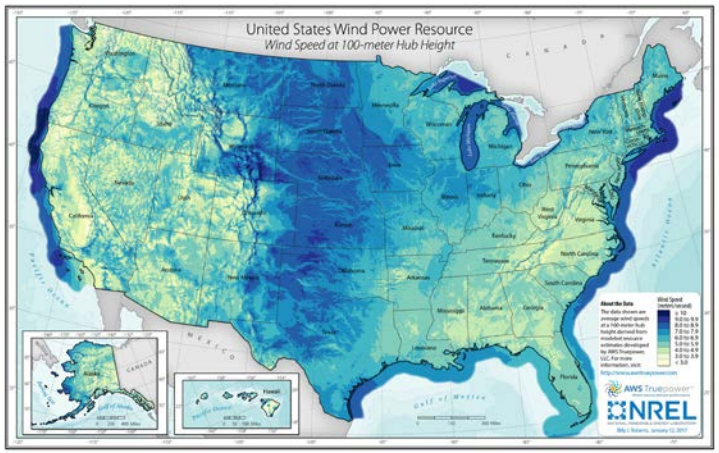


Figure 3-5. Map of Wind Power Resources in the Continental US (National Renewable Energy Laboratory)

Figure 3-6. The Kotzebue Electric Association Wind Farm

Sustainable Buildings

IHS follows several guidance documents to develop its sustainable buildings program, including the OEHE Technical Handbook, the IHS A/E Design Guide, EISA 2007, EPAct, EO 13693, and the *Guiding Principles.*

Figure 3-7. Construction of the Kayenta Healthcare Center and installation of PV Panels on the rooftop

Feature: Fort Yuma Health Care Center

Fort Yuma Health Care Center (FYHCC) is a facility under construction in Winterhaven, California. It is anticipated to be complete in March 2018 and is on track to earn a LEED Gold Certification. The FYHCC is a 76,300-square-foot out-patient facility with a projected annual energy usage of 963 MWh. The building design supports current theories of health care delivery and is well-suited for the surrounding environment. The overall strategy for the building is to utilize natural sunlight to supplement the installed lighting system.

Figure 3-8. Rendering of the completed Fort Yuma Health Care Center

The surrounding environment was kept in mind while designing the facility. The "U" shape of the building and its orientation shields building entries and courtyard spaces from the prevailing southwest and western winds. The building is also designed to retain all of the stormwater run-off of pre-development conditions.

Figure 3-9. Fort Yuma under construction with PV panel shaded parking

The design includes a rooftop PV system as well as a series of shaded parking covered with PV panels. The entire PV system has a projected annual energy production of 496 MWh per year. This means that the on-site renewable system is anticipated to provide more than half of the annual energy load of the facility. Provisions in the design have been made for the future installation of additional rooftop PV panels.

The building will not use potable water for irrigation. Irrigation water will be provided from cooling tower blowdown water, which is collected in a sump and pumped into a cistern, where it is distributed through a drip irrigation system. Native plants will be incorporated in the landscaping scheme that are drought resistant and appropriate for the local climate.

Rammed earth walls, which are native soil materials mixed with a small amount of cement, are utilized inside the building along the main concourse and in other various locations (as seen to the right). This practice cuts down on waste and materials while embracing the local landscape.

This facility is estimated to save $107,000 per year in operational cost when compared to ASHRAE standards.

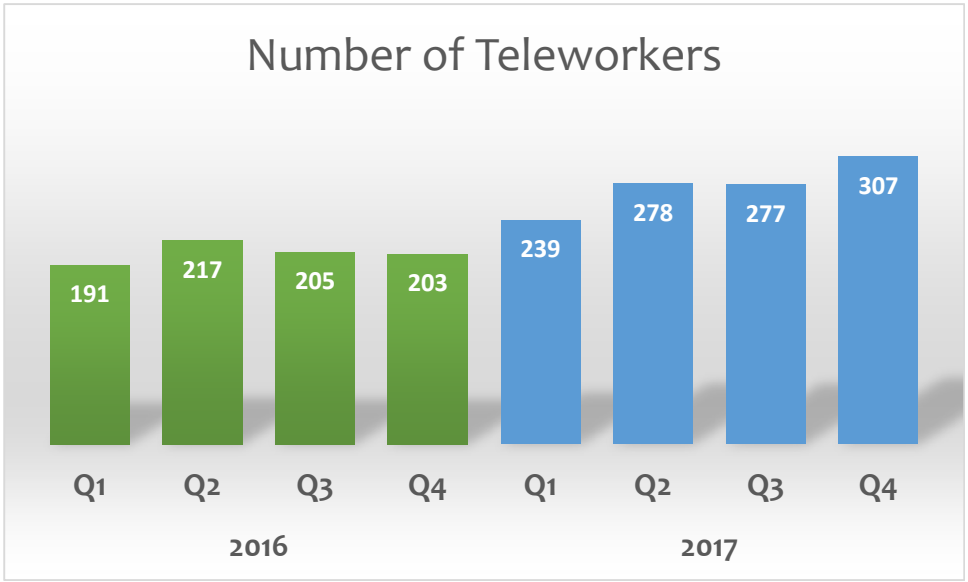
Figure 3-10. Fort Yuma under construction with rammed earth walls

Telework

Telework participation helps to reduce GHG emissions associated with employee commuting. IHS has increased telework participation through continuing education and promotion of the telework program. The number of teleworkers has increased from 191 in the first quarter of FY 2016 to 307 in the fourth quarter of FY 2017. The number of estimated annual telework days increased from 26,832 in FY 2016 to 45,812 in FY 2017. Since most IHS employees are required to be on-site to support the provision of patient care, a relatively small portion of employees are eligible for telework.

The IHS Telework Arrangement Program (TAP) policy was revised and implemented in the first quarter of FY 2016, standardizing the procedures and guidance within the organization.

Figure 3-11. Number of Teleworkers (ranging from one to five days per week) for FY 2016 and 2017 by Quarter



Fleet Management

EO 13693 Section 3(g) states that operating divisions (OPDIVs) with a fleet of at least 20 motor vehicles will improve fleet and vehicle efficiency and management. EO 13693 section 3(g)(ii) requires OPDIVs to reduce fleet-wide per-mile GHG emissions from OPDIV fleet vehicles relative to a FY 2014 baseline and sets new goals for percentage reductions, which are not less than 4 percent by FY 2017, not less than 15 percent by FY 2020 and not less than 30 percent by FY 2025. EO 13693 Section 3(g)(i) requires that agencies determine the optimum fleet inventory, emphasizing elimination of unnecessary vehicles.

IHS is continuously replacing inefficient vehicles with more efficient vehicles, typically hybrid vehicles. IHS supports using E-85 Flex-Fuel vehicles where the fuel is available. In FY 2016, 146 vehicles were replaced with low emitting GHG vehicles and diesel vehicles. Currently, 56 percent of the IHS fleet is considered "fuel efficient." Best management practices include replacing a vehicle with fuel efficient vehicles and minimizing the acquisition of sport utility vehicles unless absolutely necessary.

Feature: PIMC

The Phoenix Indian Medical Center in Phoenix, Arizona has a campus of 22 buildings (total space of 284,754 square feet). IHS has contracted with Southwest Gas Corporation to provide Utility Energy Service Contract program support. The goal of this project is to achieve multiple ECMs that lower the energy and water usage of the facility through boiler enhancements, ventilation improvements, lighting upgrades, PV system installation, transformer replacements and water system upgrades.

Figure 3-12. Phoenix Indian Medical Center

EMCs at PIMC:

- **Boiler Improvements** - Installing boiler exhaust stack economizers and replacing failed steam traps, use of chilled water for sterilization condensate tempering and removal of an unused steam line
- **Ventilation Improvements** - Installing new high-efficiency HVAC rooftop units, indirect evaporative cooling, kitchen exhaust hood controls, disinfecting ultraviolet (UV) lamps in air handling units
- **Lighting Upgrades** - Replacing interior and exterior lighting with LED fixtures and adding occupancy sensors and additional controls
- **Photovoltaic System Installation** - Install carport and roof-mounted solar panels that will produce approximately 280 kW of renewable electricity on site
- **Transformer Replacements** - Replace transformers with new high-efficiency units
- **Water System Upgrades** - Installing low-flow fixtures including flush valves, faucets, and shower heads

The simple payback period for this project is 16.9 years, and the estimated $370,000 annual cost savings will allow the facility to use those funds for more pressing needs once the project has paid for itself.

"Earth does not belong to man; man belongs to Earth"
- Chief Seattle

Chapter Four

Water Efficiency

The OEHE A/E Design Guide and *Guiding Principles* direct new construction projects to:

- Design indoor water systems to reduce potable water consumption by 20 percent compared to the baseline established by American Society of Heating Refrigerating and Air Conditioning Engineers Standards (ASHRAE)
- Install water meters to enhance water use management
- Use water efficient landscape and irrigation strategies to minimize outdoor potable water consumption
- Employ design and construction strategies that control and clean storm water run-off from IHS sites
- Use the EPA's WaterSense-labeled products and programs

Left: Quileute Indian Reservation in La Push, Washington

Water Conservation Measures

The Sustainability Audits conducted in FY 2016 and 2017 also resulted in reports that provided each facility with details and specific recommendations, including water conservation measures (WCMs) to improve water efficiency. Examples of WCMs being implemented at IHS facilities include xeriscaping, rainwater collection, building recommissioning and utilizing cooling tower water discharge for irrigation.

Rainwater Collection

To save on potable water, some facilities collect the precipitation to use as irrigation for landscaping. The rain is collected in cisterns and pumped to irrigation systems as needed. This eliminates the use of potable water for outdoor irrigation, helping to reach the 20 percent water consumption savings goal. This system also improves stormwater management by collecting much of the potential rainwater run-off. Water conservation is further enhanced when this practice is combined with xeriscaping.

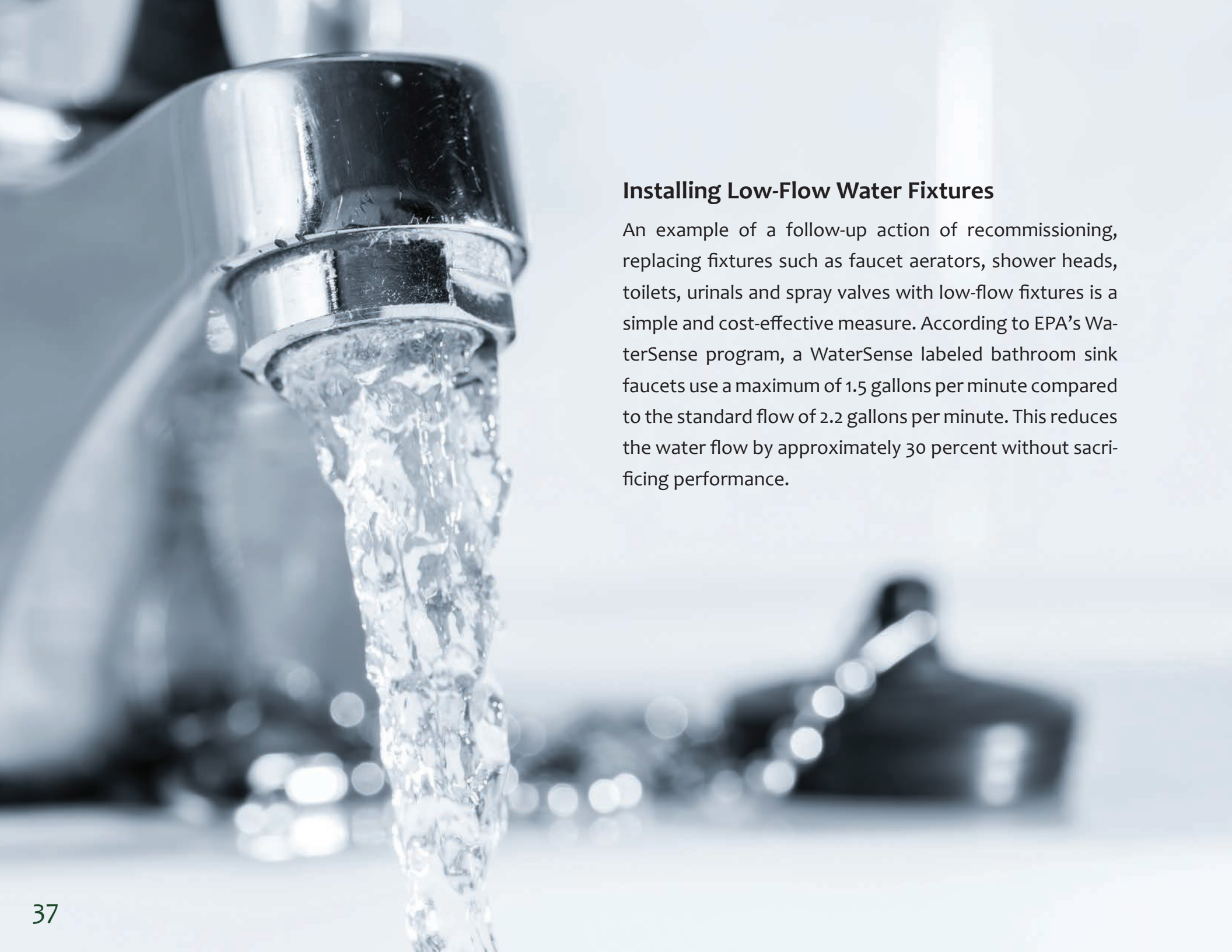
Utilizing Cooling Tower Water

Some IHS facilities with chillers have cooling towers that are an essential piece of equipment. They remove the heat that is created as a byproduct of cooling the building. Cooling towers remove heat by the process of evaporation. As a result, chemical concentration build-up in the cooling tower water necessitates replenishment of the water to avoid blockage and corrosion. The leftover water is then used for irrigation after treatment.

Figure 4-1. Cooling Towers at Fort Yuma

Building Recommissioning

Throughout a building's lifetime, chilled water, heating water and domestic hot water system controls need to be revitalized to ensure highly functional operation and optimized performance. System efficiencies typically drop if leaks occur, filters get clogged or controls don't work properly resulting in higher water usage. Implementing a commissioning strategy for each building system can help minimize operational inefficiencies. Commissioning actions that can lead to water savings include leak detection, equipment blowdown optimization, water use measurement resetting and overflow alarm validation. Ideally, recommissioning studies and follow-up actions are integrated in the building operation & maintenance plan and performed by staff on a scheduled basis.



Installing Low-Flow Water Fixtures

An example of a follow-up action of recommissioning, replacing fixtures such as faucet aerators, shower heads, toilets, urinals and spray valves with low-flow fixtures is a simple and cost-effective measure. According to EPA's WaterSense program, a WaterSense labeled bathroom sink faucets use a maximum of 1.5 gallons per minute compared to the standard flow of 2.2 gallons per minute. This reduces the water flow by approximately 30 percent without sacrificing performance.

Feature: Crow Agency Rainwater Collection

The Crow/Northern Cheyenne Hospital in Crow Agency, Montana plans to install a rain water collection system for irrigation. Rain water will be collected from the hospital roof drainage and stored in an underground storage tank. The system will include storage tanks, pumps, controls, and piping to connect to the existing irrigation system. The project will allow for maintenance of the green space that visually enhances the facility in an area that has a stressed public water supply.

Water, electrical and maintenance savings is calculated to be $28,100 per year and will save approximately 75,000 gallons of potable water. The project is expected to be complete in the spring of 2018 and the total payback will be approximately 5 years.

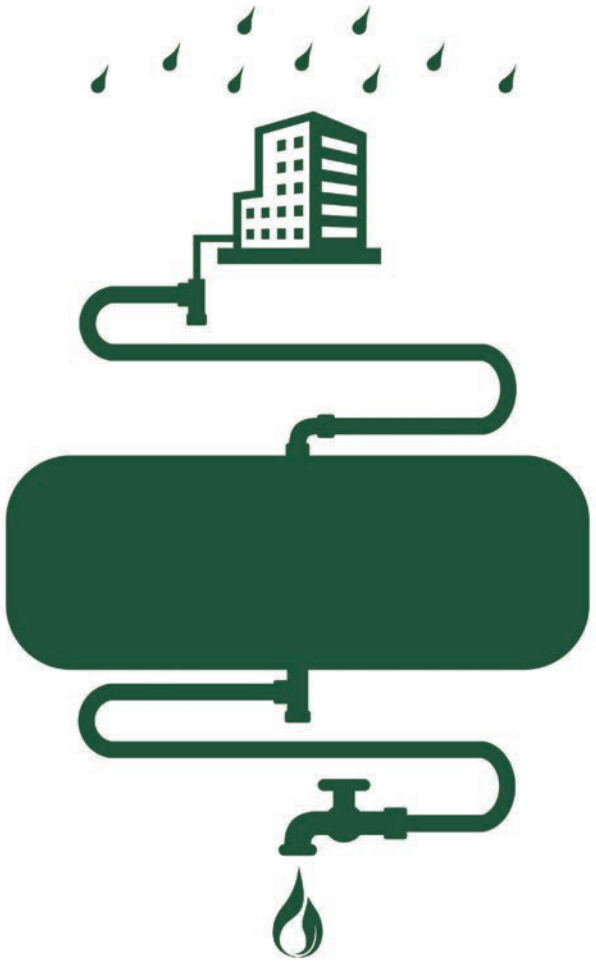


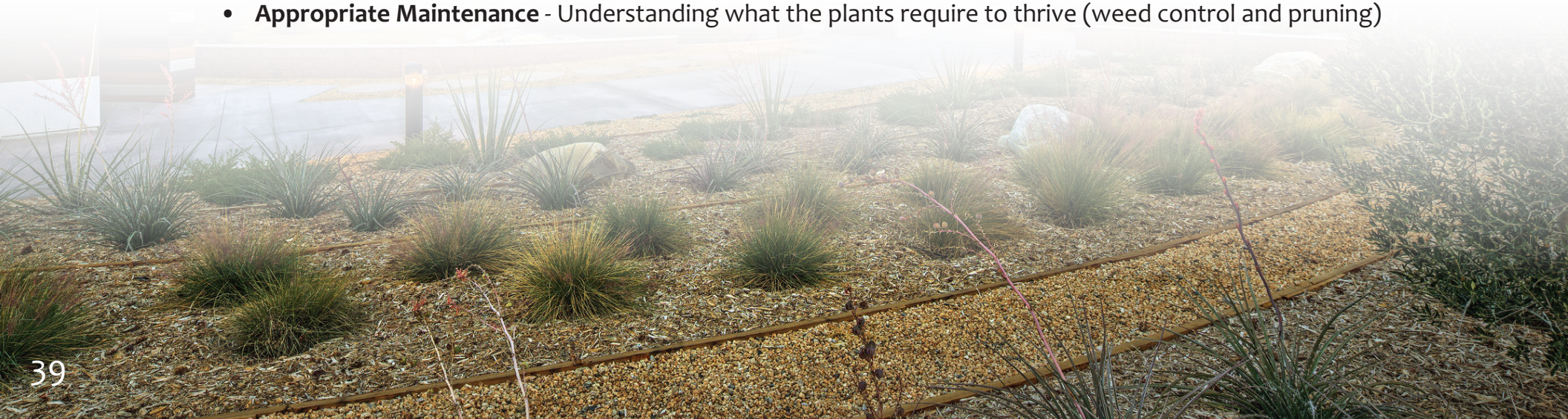
Figure 4-2. Diagram of a rainwater collection system

Xeriscape and Landscaping Techniques

Many IHS facilities are located in arid climates and frequently experience water shortages. When this happens, potable water must not be used for irrigation. Xeriscaping is the practice of designing landscapes or gardens with techniques that can help reduce or eliminate the need for irrigation and still be aesthetically pleasing. Choosing native plant species that are compatible with the local climate minimizes maintenance and water costs. Once established, native drought-resistant plants that can thrive off of natural rainfall alone do not require irrigation at all. These plants are watered regularly to get established and then are watered only when necessary during extended droughts. While not necessarily considered xeriscaping, some designs feature rock formations or gravel as ground cover to further reduce maintenance.

Xeriscape is based on seven water-wise landscaping principles:

- **Planning and Design** - Allows for grouping of plant maintenance and use of terracing on slopes
- **Soil Improvement** - Plants benefit from the use of compost and nutrients
- **Efficient Irrigation** - Drip-lines ensure all plants get watered
- **Low Water-Use Plants** - Native plants require less water and are more climate tolerant
- **Mulch** - Provides cover, prevents evaporation, and limits weed growth
- **Practical Turf Areas** - Limit the grass lawn to areas of functional use
- **Appropriate Maintenance** - Understanding what the plants require to thrive (weed control and pruning)



Feature: Fort Washakie Health Center Xeriscape Project

The Fort Washakie Health Center in Fort Washakie, Wyoming is replacing and updating their landscaping and irrigation system around the exterior and parking lot of the facility. Xeriscaping will include replacing turf grass with mulch, rocks or boulders, and native grasses and plants, which will flourish in the natural environment.

The water, electrical, and maintenance savings is estimated to be $20,100 per year and will save approximately 57,000 gallons of water per year.

Feature: Unity Healing Center Solar Water Heater

The Nashville Area Unity Heating Center in Cherokee, North Carolina installed a solar powered domestic water heating system as a result of an energy audit. Data loggers installed on the water heaters allowed for the determination that on full sun days the system makes more hot water than used. Cloudy days, while not as productive, needed only a minimal supplement of energy usage by pre-heating the domestic water supply.

Monthly utility bills are used to track energy consumption. Prior to installation of this and other energy conservation measures, an average of 250,000 kWh per year were used. Completion of this project in December 2016 has reduced energy consumption to 200,000 kWh per year, a 20 percent reduction from current usage and a 33 percent reduction from the baseline in 2008.

Figure 4-3. The Unity Healing Center with rooftop PV panels


“We are part of the earth and the earth is part of us”
- Unknown

Chapter Five

Get Involved

The IHS engages in several outreach and communication initiatives. Key outreach initiatives included:

- Maintaining up-to-date information on the IHS Sustainability Website
- Posting Green Tips that can be used by everyone
- Encouraging nominations for the HHS Green Champion Awards Program
- Encouraging IHS employees and the general public to be mindful of our environment

Left: Denali National Park, Alaska

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 related documents
- Web-pages by topic to explore further: Energy Management; Electronics Stewardship; Pollution Prevention; Sustainable Acquisitions; Sustainable Buildings, Sustainable Communities; and Water Conservation
- Green Tips to raise awareness on various sustainability issues and provide tips that can be implemented at home or in the workplace at little or no cost
- An archive of past Sustainability Annual Progress Reports
- A web-page recognizing IHS recipients of the HHS Green Champions Awards

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. The following are examples of posted Green Tips in FY 2016 and 2017.

Green Tip: Reduce Waste with Composting!

The U.S. EPA says about 24 percent of common household waste is organic material that can be composted. In fact, Americans throw away an average of 1.3 pounds of food scraps daily - translating to almost 13 percent of the municipal solid waste stream. However, only 8 percent of Americans compost their waste. If your local public solid waste utility does not offer a food and yard waste program, why not start composting on your own? It will reduce waste and you create your own fertilizer!

Common compostable items include:

- fruit and vegetable scraps
- eggshells
- grains
- coffee grounds and tea bags
- grass clippings and other yard waste

Green Tip: Plastic Waste

In 2014, 33 million tons of plastic waste was generated in the US and only 9 percent was recovered for recycling. Most plastic waste ends up in landfills, but a large amount is discharged through stormwater runoff into oceans, where it accumulates and causes physical harm to aquatic life such as birds, fish and marine mammals.

While animals can get entangled in larger plastic items, approximately 90 percent of the plastics in marine environments deteriorate to small particles called microplastics. These tiny plastic beads are very difficult to remove and are ingested by wildlife; some of which are a human food source.

What You Can Do:

- Buy items with less packaging
- Bring reusable bags to stores
- Use reusable containers instead of plastic bags
- Use reusable water bottles and coffee cups
- Don’t buy cleaning or health/beauty products with microbeads
- REDUCE, REUSE and RECYCLE!

Green Champion Awards

HHS created the Green Champion Awards Program to award Operational Division staff for their sustainability-related work. Two of the FY 2016 IHS Green Champions have already been featured in this Report.

Energy & Fleet Management Award

Kotzebue Hospital Wind-to-Heat Energy Project

Alaska Native Tribal Health Consortium: William Fraser, PE; Craig Wood, PE; Praveen K.C., PE; David Reed, PE; Maniilaq Association: Adriel Perry; Kotzebue Electric Association: Matthew Bergan

The Maniilaq Association, in cooperation with the Alaska Native Tribal Health Consortium and Kotzebue Electric Association (KEA), recently completed work on a unique renewable energy project. The Maniilaq Health Center in Kotzebue, Alaska installed a heat system to reduce energy costs and GHG emissions. Excess wind energy from the Kotzebue Electric Association's 3-megawatt wind turbine farm is directed to a 450-kilowatt electric boiler in the hospital. The boiler provides space heating at a discount and reduces the hospital's consumption of fuel oil. For KEA, the system provides a large electric load for micro-grid stability and an additional revenue stream which benefits KEA's customers.

The project was born out of necessity in coping with record high fuel oil prices in recent years. In 2012, the hospital spent over $2 million on energy costs and over $1 million alone for fuel oil. Historically, the hospital consumed approximately 164,000-gallons of fuel oil annually. The new system is expected to cut the hospital's heating oil consumption by 20 percent and will save approximately 32,000 gallons of fuel annually.

Sustainable Design & Facilities Award

Desert Sage Youth Wellness Center Project Team

OEHE-DES: Bruce Kemmet, PE; James Aberle, RA; Nick Lu, SE; Paul Ninomura, PE; Samuel Vega-Cotto, PE; Michael Young, PE; Blackbird Associates, Inc: Leslie Thomas, RA; Stafford King Wiese Architects: Michele Gargano; Cox Construction Company: Adam Heihn

The Desert Sage Youth Wellness Center near Hemet, California provides services for American Indian/Alaska Native (AI/AN) youth ages 12 to 17 who have a substance abuse disorder as a primary diagnosis and that may have mental and/or personality disorders as secondary diagnoses. The facility consists of 35,455 square feet distributed amongst three buildings including patient residential, education, recreation, dining, therapy, administration, cultural and family suites. Construction began in October 2014 and was completed in February 2017. The facility incorporates the Guiding Principles and exceeded requirements by achieving a LEED 2009 Gold Certification.

Sustainable Design Features incorporated into the project include: preserving 78 percent of the site as open space; a high albedo roof; light pollution reduction; places of respite for staff and patients; 58 percent reduction of potable water use; indigenous and drought resistant landscaping (no irrigation); fundamental and enhanced commissioning; energy cost savings of 37 percent; minimization of mercury-containing products including lighting; diversion of 89 percent of construction waste from landfills; 20 percent of total building materials are sustainably sourced; lead-free pipes, soldering, paints, and flashing; compliance with ASHRAE 55, ASHRAE 62.1, and ASHRAE 170; installation of CO_2 monitors; pre-occupancy building flush-out; low-emitting interior adhesives and sealants; and an on-site PV system capable of providing 11 percent of the annual electrical load.

Energy & Fleet Management Honorable Mention

Billings Area and Northern Cheyenne Service Unit Facilities Department

Burke Helmer; Tyrrell Lang; Martin Reed

This project consists of replacing or upgrading existing light fixtures from current fluorescent and high pressure sodium lights to LED lighting in both the interior and exterior of the building. In addition, occupancy sensors for the lighting controls were installed at various work spaces. The improvements will directly reduce the consistent electrical base load consumption. The project cost was approximately $330,000 with an eight-year anticipated payback.


https://www.ihs.gov/sustainability/