

IMPLEMENTATION MODEL: MISSISSIPPI

ADVANCING ENERGY EFFICIENCY
in Mississippi's Institutes of Higher Learning



Because Institutes of Higher Learning (IHLs) represent over 40 percent of Mississippi's public building portfolio, a 20 percent reduction in energy consumption would result in substantial savings to the General Fund. With support from a U.S. Department of Energy State Energy Program Competitive Award, the Mississippi Development Authority launched an effort to develop a strategy for assessing the performance of buildings and prioritizing energy efficiency retrofit projects. Mississippi expanded its public building benchmarking effort to facilities at IHLs, which provided a sound basis for prioritizing and implementing energy efficiency upgrades. Energy efficiency projects undertaken at the IHLs realized significant energy and energy cost savings to the General Fund. Eager to achieve savings across the entire public building portfolio, Mississippi compiled auditing and retrofitting best practices into manuals that are available to IHLs, state agencies, and local governments.

Goal

ENERGY CONSUMPTION

↓20% BY 2020

Achieve a 20 percent reduction in energy consumption by a large subcategory of state buildings – Institutes of Higher Learning (IHL) – by 2020, using 2011 as a baseline year.

Barrier

ENERGY CONSUMPTION DATA

IHL facility managers lack energy consumption data, which is critical for planning energy efficiency retrofits.

Solution



Benchmark IHL facilities' energy use in Mississippi's central database for state facility energy consumption data. The database allows all state agencies, including IHLs, to assess their energy use and make decisions on how to target energy initiatives based on that information.

Outcome



Mississippi obtained complete and accurate information on IHL campus buildings and worked with each IHL to assess smart meter configuration and provide implementation plans to address sub-metering opportunities so that each building's energy use could be tracked. Mississippi then benchmarked IHL facilities' energy use and used the results to plan and execute energy efficiency upgrade projects, which resulted in significant energy and energy cost savings.

POLICIES

Institutes of Higher Learning (IHL) comprise 43% of the Mississippi public building portfolio by square footage. Recognizing the significance of the sector's potential to effect major statewide energy savings, the IHL Energy Management Council, a governing body composed of representatives from each institution including students, faculty, staff, administration, energy management professionals, and technical staff, set a bold goal to reduce energy consumption in their facilities by 20% by 2020.

State energy efficiency policy further emphasized public buildings in subsequent years. In October 2012, Governor Phil Bryant introduced his state energy plan, *Energy Works: Mississippi's Energy Roadmap*, which recognized the economic benefits of energy efficiency and challenged state agencies to lead by example and cut their energy use intensity. Then in 2013, the Mississippi Energy Sustainability and Development Act, HB 1296, required the Mississippi Development Authority (MDA) to collect energy data from all state facilities, including IHLs. All state agencies are required by law to report energy consumption and costs monthly online or face penalties.



Cloud-based Reporting

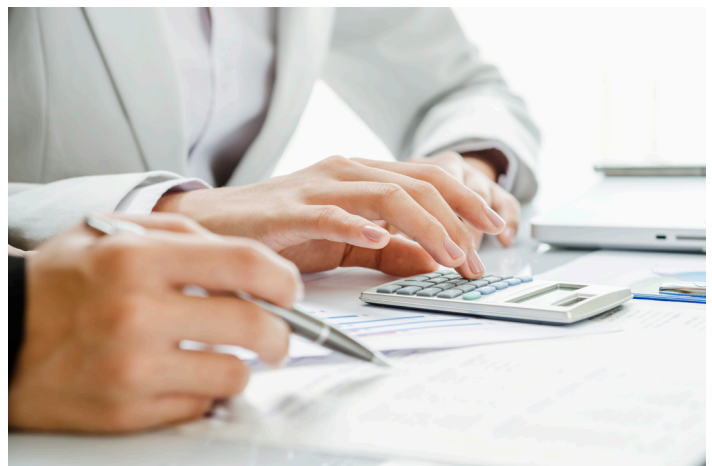
MDA and the IHL Energy Management Council used Advantage™ Navigator in coordination with ENERGY STAR™ Portfolio Manager to benchmark IHL buildings using a cloud-based energy data collection system.

MDA has utilized a cloud-based energy data collection system to collect electrical, natural gas, and fuel oil consumption data since 2010. With funding from the US Department of Energy's State Energy Program, MDA launched a project to benchmark IHL facilities' energy use in this system and use the findings to retrofit facilities with greatest energy savings potential.

PROCESS – PROGRAM DESIGN

Continued participation and support from project partners and stakeholders were critical to the success of the project. Therefore, MDA's first step in organizing its project was to recruit the best partners for the effort, based on their experience in energy efficiency, building energy retrofits, engineering, and project management. An MDA program manager led and supervised the operations of partners, which comprised a private utility consultant, the Southeast Energy Efficiency Alliance (SEEA), the IHL Energy Management Council, and Mississippi's Department of Finance and Administration Bureau of Building, Grounds, and Real Property Management (DFA).

In addition to these partners, MDA built strong relationships with critical stakeholders, including a private sector energy and operational performance platform developer, the Tennessee Valley Authority (TVA), and the facilities managers at eight universities: Alcorn State University, Delta State University, Jackson State University, Mississippi State University, Mississippi University for Women, Mississippi Valley State University, University of Mississippi, and the University of Southern Mississippi.



MDA convened partners and stakeholders at a kickoff meeting in March 2013 in order to align project goals and seek support. During the meeting, MDA and the platform developer presented the project plan and introduced the cloud-based energy data collection system as the central data collection system for the project.

PROCESS – IMPLEMENTATION

Success of a benchmarking effort relies on complete and accurate data, and the active participation of stakeholders was crucial to ensuring the quality of the building inventory data.



1 Complete IHL Inventory for Online Energy Database

MDA's project manager and the Utility Analysts, Inc. consultant, made site visits to each of the ten IHL campuses (eight universities, the University of Mississippi Medical Center, and the Education and Research Center) to assess conditions and collect information. The site visits allowed MDA to refine the building inventory to include complete and accurate information on the following:

- total number of buildings and facilities;
- total square footage of each building and facility;
- number and square footage of buildings and facilities that have undergone energy efficiency retrofits in the past five years; and
- the types and extent (in terms of square footage and measures installed) of retrofits in each building.

Ensuring building information was complete and accurate was a critical component of the project. Verification of building square footage was needed to determine each building's energy use intensity (EUI). The site visits also provided the campuses the opportunity to add buildings or meters not previously connected to the cloud-based energy data collection system, so that campus energy managers can have a complete and accurate picture of their building portfolio's energy performance.

2 Determine Metering Capacity at IHLs and Install Meters

MDA and the platform developer conducted the second round of site visits to IHL campuses beginning in December 2013 to discuss the status of utility meter configurations and data collection capabilities. Mississippi began installing smart meters in public buildings in 2009 through its Recovery Act-funded High Performance Buildings with Smart Metering program. Prior to this program, many campuses were master metered, which made it impossible for facilities managers to understand the performance of individual buildings on campus and make informed energy efficiency project selections. The program resulted in approximately 950 meters deployed statewide, and achieved such success facilitating a greater level of understanding of existing consumption and improvement possibilities for State-owned buildings that DFA developed a plan to submeter all remaining state buildings within five years.

The project team's site visits provided the opportunity to identify locations for new smart meters and broken smart meters for repair as part of its effort. The platform developer also completed onsite surveys of buildings and interviewed facilities' staff to determine the scope of activities needed to achieve campus-wide sub-metering and data collection.

The platform developer's analysis found that the level of operational electric submetering for individual buildings varied among the IHLs. Each campus had instances of master-meter configurations, where more than one building feeds into a singular utility meter. The platform developer's implementation plans outlined the actions necessary to implement campus-wide, electrical smart metering, including sub-metering buildings, installing smart meters, and developing the technological infrastructure to support data transfer.

For each IHL where new smart meters were recommended, the platform developer prepared a 3-4 page implementation plan for the meters, including details on budget, the scale of work, and the timeline for installation. MDA distributed the smart meter installation work among engineering firms selected through a Request for Qualifications to complete the work. Smart meters were installed at four IHLs: Mississippi University for Women, Mississippi Valley State University, Delta State University, and Alcorn State University.

The project team's site visits provided the opportunity to identify locations for new smart meters and broken smart meters for repair as part of its effort.

3 Compile Baseline Energy Performance and Benchmark IHL Facilities

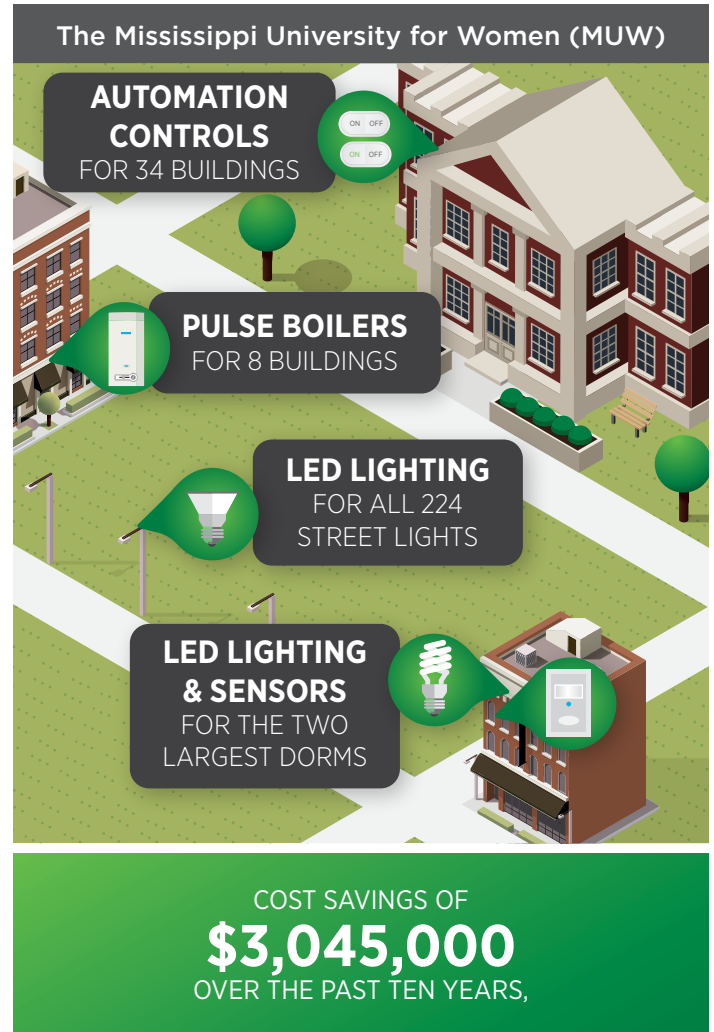
MDA worked with the IHL Energy Management Council to establish baseline energy performance data for each IHL. The project team used Advantage™ Navigator in coordination with ENERGY STAR™ Portfolio Manager to benchmark the IHL buildings. The baseline informed a comparative analysis, conducted to effectively select which projects to prioritize.



MSU conducted a campus-wide LED lighting project, which retrofitted lighting fixtures and upgraded lighting controls to optimize usage in approximately 2.2 million square feet of building space. Institutional funds paid for the \$6,500,000 project, which is on track to save nearly \$1,200,000 annually. Through careful measurement of utility savings and costs, the university financial officers will allocate the cost avoidance seen in its utility budget to future energy savings projects.

4 Begin Energy Efficiency Retrofits at IHLs

MDA, the private utility consultant, SEEA, the IHL Energy Management Council, and DFA then developed a robust energy efficiency strategy for all IHL facilities. The strategy describes a step-by-step process for IHLs on how to finance high-priority retrofits and assess their results. Several IHL facilities followed this strategy to undergo energy efficiency retrofits, including Mississippi State University (MSU).



MUW has undergone a series of energy efficiency projects with institutional and utility funding to reduce its energy usage by 28 percent campus-wide. To accomplish these savings, MUW added automation controls to 34 buildings on campus, installed energy efficient pulse boilers to take the place of steam manufacturing plants to eight buildings on campus, and replaced all 224 street lights on campus with high-efficiency LEDs. The two largest dormitory buildings at MUW were upgraded by installing occupancy sensors and replacing all incandescent hallway lighting with LEDs. Over the past ten years, these measures have resulted in estimated cost savings of \$3,045,000.

5 Publish Energy Best Practices

The final step in this project was to collect and publish best practices for distribution to other state agencies interested in implementing energy efficiency retrofits. MDA captured information on the processes that were employed at the IHL campuses to implement energy policies and building retrofits and developed *Implementing Energy Plans and Policies: A How-To Guide*. The How-To Guide is designed to help state agencies new to energy efficiency and conservation, and provides an overview of how to effectively execute energy programs and policies. The [How-To Guide](#) has been sent to all Mississippi state agencies, including the IHLs, via email, and is available on MDA's [website](#).

MDA also published the *Implementing Building Energy Retrofits Strategy Guide* as part of its best practices reporting. The Strategy Guide includes information on how to gain support for energy projects, steps on how to benchmark buildings, a list activities and measures for achieving the 20% energy reduction goal across the entire portfolio of buildings, and a list of resources and financing opportunities. The [Strategy Guide](#) is available on MDA's website.



**Implementing Energy Plans and Policies:
A How-To Guide**

[LEARN MORE](#)



**Implementing Building Energy Retrofits
Strategy Guide**

[LEARN MORE](#)



OUTREACH

Outreach was critical to MDA's management of the project's day-to-day operations and to maintaining its relationship with stakeholders.

MDA maintained strong communications with IHLs via in-person site visits, e-mails, and webinars throughout the project. MDA also provided trainings and instructional materials on how to use, run, and create reports in Advantage™ Navigator. By fostering individual relationships with facility managers and staff at each institution, MDA has been able to quickly identify the needs and concerns specific to each IHL, which has allowed for more targeted and effective application of project resources.

MEASURING SUCCESS

MDA measured success for this project in the following ways:

Number of
smart meters installed
AT IHL FACILITIES

Number, type, and scope
of retrofits performed
AT IHL FACILITIES

Energy and cost savings
realized through retrofits
AT IHL FACILITIES

MDA and its partners will continue to measure the performance of its state building portfolio using the reports and analysis that can be pulled from the cloud-based energy and operational performance platform. The platform will continue to allow all state agencies, including IHLs, to assess their energy use and make decisions on how to target energy initiatives based on that information.

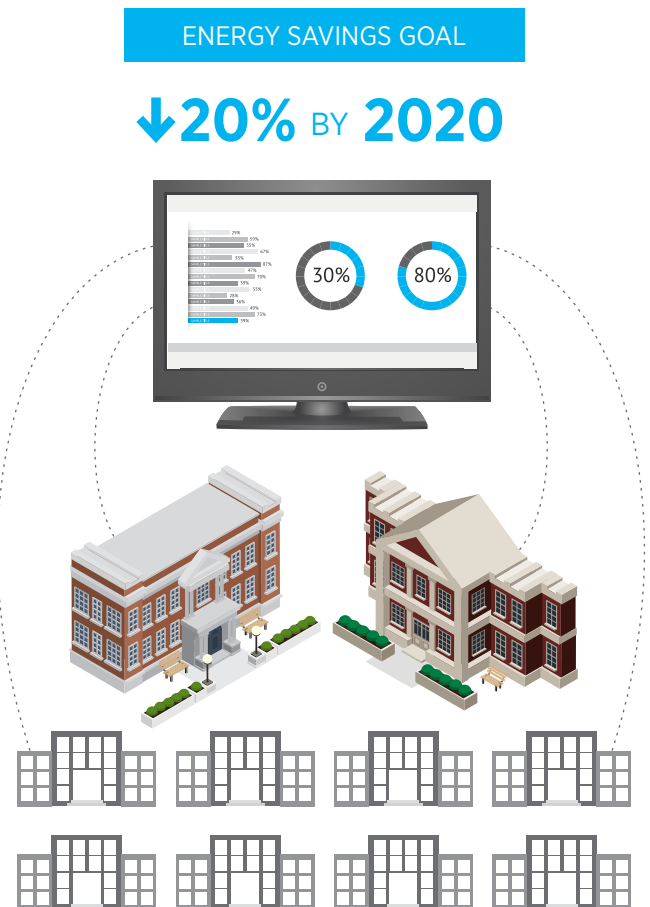
OUTCOMES

In the past, every IHL had been master-metered for both electricity and natural gas, making it impossible to benchmark individual facilities or track individual energy management projects' benefits. MDA's efforts resulted in greater energy efficiency infrastructure and greater energy savings potential at IHL campuses across the state. Before the project commenced, there were 333 smart meters at five IHLs, and more than 400 smart meters were installed at IHL campuses as a result of the project.

Each IHL in Mississippi can now connect these individual sub-meters to Advantage™ Navigator and automatically report energy usage data.

Tracking energy performance has revealed not only the areas of opportunity to improve energy efficiency in the IHL system but also significant energy savings between 2011 and 2015, showing progress towards the 20% energy savings goal. Three highlighted campuses, Mississippi Valley State University, Itta Bena, Jackson State University, and University of Southern Mississippi, Hattiesburg, showed on average 15 percent electricity and 18 percent natural gas savings.

As Mississippi IHLs utilize benchmarking data to prioritize and execute energy efficiency projects, other state agencies will be able to follow suit using the *Implementing Building Energy Retrofits Strategy Guide* and *Implementing Energy Plans and Policies: A How-To Guide* to save energy across the state.



Tools & Resources

[Implementing Energy Plans and Policies: A How-To Guide](#)

[Energy Efficiency Retrofit Strategy](#)

[IHL Benchmarking Project Kickoff Meeting Agenda](#)

[IHL Benchmarking Project Kickoff Meeting Presentation](#)