Alabama State Buildings Energy Conservation Initiative

Executive Order Number 25 Report

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Prepared for:

Governor Robert Bentley

Prepared by:

Alabama Department of Economic and Community Affairs
Energy Division

Jim Byard, Jr.
Director

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Introduction

Executive Order Number 25 (EO 25) was signed November 15, 2011, and issued December 28, 2011, by Governor Robert Bentley. All State departments and agencies shall reduce energy consumption by Fiscal Year 2015, as the State works to implement energy-efficient practices and reduce wasteful and inefficient uses of energy. Under EO 25, all State agencies and departments are to designate an Energy Officer to study, investigate and recommend energy saving procedures and practices for their agency. Agencies must reduce energy consumption by 30 percent by 2015, relative to 2005 levels. However, many agencies did not have the resources to locate and input data dating back to 2005. After further review, FY 2011 proved to be a more suitable benchmark as data for this year was readily available to all agencies.

EO 25 was a continuation of the State Buildings Energy Efficiency Program that began in 2006 with Executive Order Number 33 (EO 33). EO 33 required all State agencies and departments to reduce energy consumption by 10 percent in state-owned and operated buildings by October 1, 2008, and 20 percent by October 1, 2010, relative to 2005 levels. Agencies meeting or exceeding the EO 33, 2010 goal of 20 percent reduction in energy consumption were the Alabama Forestry Commission, Military Department, Alabama Department of Agriculture and Industries, and Alabama Emergency Management Agency.

EO 25 also requires all State departments to use the U.S. Environmental Protection Agency's (EPA) ENERGY STAR Portfolio Manager Program for benchmarking and has created an increase in the need for training with the appointment of new Energy Officers.

Program Performance Summary

There are 15 State agencies utilizing EPA's ENERGY STAR Portfolio Manager to report usage for 1,671 buildings. The following chart reflects agencies reporting change from the Base Year of 2011, and the reductions towards meeting the EO 25 goal of a 30 percent reduction in energy consumption by FY 2015. Since FY 2011, State agencies have saved/avoided an estimated $16.5 million in energy costs and reduced energy consumption by 52.2 percent.

Agency	Bldgs (#)	Square Footage	Energy Consumption 2011 v. 2014	Costs Saved/Avoided 2011 - 2014
Alcoholic Beverage Control Board (ABC)	1	174,610	(1,059,425)	$ (37,970)
Community College System (ACCS)	1,367	17,636,542	(2,564,730,134)	$ (14,007,948)
Corrections (ADOC)	203	2,987,144	(68,440,912)	$ (1,458,527)
Emergency Management Agency (AEMA)	2	35,000	(202,300)	$ (11,019)
Environmental Management (ADEM)	5	195,222	(2,337,521)	$ (103,465)
Finance	10	1,833,076	5,150,966	$ 55,037
Forestry Commission	1	29,936	(53,939)	$ (4,487)
Geological Survey/State Oil and Gas Board	2	95,967	967,629	$ 11,766
Institute for Deaf and Blind (AIDB)	4	556,758	(1,142,422)	$ (20,293)
Mental Health	2	526,996	(25,546,568)	$ (687,329)
Military Department	4	292,721	(2,151,465)	$ (33,070)
Pardons and Paroles	1	73,517	(299,521)	$ (3,973)
Public Health	58	996,221	(3,600,314)	$ 124,168
Supreme Court of Alabama*	1	265,017	*n/a*	$ (55,698)
Transportation (DOT)	10	1,221,323	(14,206,488)	$ (343,271)
	1,671	**26,920,050**	**(2,677,652,414 kBtu)**	**$ (16,576,081)**
			(52.2%)	

**2014 data was not reported*

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Alabama Alcoholic Beverage Control Board

- Installed High Bay LED lights in the warehouse
- Stores replaced current lamps with ENERGY STAR rated lamps
- New and renewed leases were revised to require the landlord to install ENERGY STAR rated lighting, water heaters, electric and gas heaters/AC units, sinks and toilets

Alabama Community College System

- Upgraded indoor and outdoor lighting to fluorescent or LED; many of these retrofits incorporated motion sensors or timers to control usage
- Ensured optimal performance of HVAC systems by replacing outdated or inefficient equipment and managing usage through building management systems and programmable thermostats
- Educated employees in energy efficiency as well as established a campus-wide energy conservation initiative
- Retro-commissioned current campuses, considered potential upgrades and savings measures, and evaluated performance contracting proposals; these measures were accomplished through both in-house staff and the aid of utility providers, architectural firms, and Energy Services Companies (ESCO)
- Consolidated classes to the fewest number of buildings and reduced scheduling hours during the summer
- Ensured that any new equipment purchased utilized the most energy-efficient technology feasible
- Evaluated building insulation and replaced or added insulation when needed

Alabama Department of Corrections

- Contracted with an ESCO to assess the feasibility of executing another Energy Performance Contract; an investment grade audit has been completed and areas identified as having potential for additional savings include perimeter lighting, steam system controls, energy management systems, and dryer heat recovery
- Ten new 15-passenger vans were purchased and converted to bi-fuel (propane/gasoline) along with acquiring a 2,000 gallon refueling station; the average savings are 10.8 cents for every mile
- Contracted with a utility auditing firm to assess utility bills for errors and ensure billing is charged at the most economical utility rate available

Alabama Emergency Management Agency

- Utilized Energy Management Controls to ensure optimum equipment performance

Alabama Department of Environmental Management

- Continued to require compliance with its Energy Conservation guidance memorandum
- Considering energy-efficient upgrades as equipment, lights, etc. need replacing

Alabama Department of Finance

- Replaced the HVAC system in the Alabama State House which also serves the State Capitol
- Replaced two steam boilers with six non-condensing hot water boilers of much higher efficiency
- Separated a domestic hot water system from the steam boilers for a more efficient system

Alabama Forestry Commission

- Continued renovations and improvements to existing air handling systems
- Continued lighting renovations to LED bulbs
- Reduced office occupancy
- Employee policies increased energy use awareness and the need to conserve
- Carbon footprint has been reduced by 50 percent

Geological Survey of Alabama/State Oil & Gas Board

- Completed upgrades of incandescent bulbs to either CFL or LED bulbs
- An Investment Grade Audit is now in progress

Alabama Institute for Deaf and Blind

- Replaced T-12 fixtures with T-8 fixtures within Alabama School for the Blind (ASB), Alabama School for the Deaf (ASD) and Helen Keller School (HKS)
- Replaced HVAC units within ASB, ASD and HKS instructional buildings
- Replaced two dormitory air handling/condensing units
- Replaced a HKS Play Therapy Center HVAC unit
- Replaced a condensing unit and boiler with four electric heat pumps at HKS

Alabama Department of Mental Health

- Established stand-alone meters for the Harper Center
- Relocated Bryce Hospital to a new building featuring energy-efficient boilers and chillers controlled by a Building Automation System

Military Department

- Completed five Energy Management Control Systems (EMCS) projects, 11 lighting projects, and seven HVAC systems projects
- A project upgrading EMCS at 21 sites is in progress
- Design deficiencies corrected
- Replaced HVAC system with high efficiency heat pumps
- Installed a geothermal field with ground source heat pumps

Alabama Board of Pardons and Paroles

- Replaced all incandescent bulbs with energy saving bulbs
- All commodes, shower heads and faucets have been replaced in all housing units

- All water leaks were repaired upon detection
- Hot water heating systems are being converted to a circulating boiler system
- Energy-efficient controls have been upgraded to automatic digital controls
- Any HVAC system needing replacement has been upgraded to heat pumps with digital thermostats and lock out controls
- Washing machines and dryers are being replaced with energy-efficient units

Alabama Department of Public Health

- Collected data to assess energy usage in buildings across the state

Supreme Court of Alabama

- No report submitted

Alabama Department of Transportation

- Educated all personnel in ways to reduce power consumption
- Upgrading older non-efficient equipment to higher SEER ratings and equipment utilizing "soft start" frequency drive components for HVAC equipment when possible
- Revised lighting and equipment run-time schedules to reduce load demands
- Upgraded T-12 bulbs to T-5 bulbs with electronic ballasts
- Upgraded interior lighting fixtures that utilize a diffuser that spreads more light using fewer bulbs

Trainings & Recommended Low-cost/No-cost Energy Conservation Measures

The ADECA - Energy Division provided technical assistance and training to State departments and agencies. Through workshops, webinars and conferences, the Energy Officers were trained in no cost energy efficiency practices, Portfolio Manager Data maintenance and reporting, as well as Commercial Building Auditing. The Energy Officers were also trained in utility invoice analysis, and how to review and verify that energy bills are correct and billed at the most advantageous rate for which the agency/facility is entitled. Representatives from 37 State agencies, departments and institutions have attended one meeting and three workshops.

FY 2014 Training Workshops:	
November 21, 2013	Energy Officers Meeting (Montgomery)
July 23, 2014	Commissioning / Re & Retro Commissioning (Birmingham)
July 30, 2014	Commissioning / Re & Retro Commissioning (Troy)
August 6, 2014	Commissioning / Re & Retro Commissioning (Mobile)

Recommended Low-cost/No-cost Energy Conservation Measures
• Ensure energy use reduction during peak demand periods to both save energy and costs
• Review and verify that energy bills are correct and billed at the most advantageous rate for which the agency/facility/department is entitled
• Ensure lighting systems are turned off during non-operating hours
• Conversion to more energy-efficient lighting systems and bulbs as existing systems and bulbs reach the end of their life cycles
• Maximize use of natural lighting consistent with temperature control
• Replacement of conventional light switches with motion-sensor switches
• Replacement of incandescent lights in exit signs with LED fixtures
• Removal or reduction of all other non-essential lighting
• Set standards/ensure HVAC systems operate at appropriate levels at all times, to include reduced levels during non-operating hours
• Use of Building Automation Systems (BAS) and Automated Temperature Control (ATC) systems; set operating schedules to coincide with work day/work week
• Ensure preventive maintenance of HVAC systems to include cleaning/filter replacement
• Ensure all equipment powered by electricity is turned off when not in use
• Temperature reduction for hot water heaters in all facilities except where operational needs require a specific water temperature
• Prohibition of personal space heaters except in areas where central HVAC systems cannot provide adequate heat under objective standards
• Improve insulation of windows, doors, walls, roofs, floors, and sealing of ductwork
• Ensure employees are educated/trained in energy conservation methods as applicable to their duties and responsibilities

Acronyms & Definitions

ATC	Automated Temperature Control
BAS	Building Automation System
Base Year	The selection of FY 2005 as the Base Year was established on U.S. Environmental Protection Agency documents for energy reduction opportunities in buildings and established standards for benchmarking energy performance.
Benchmarking	Benchmarking involves measuring and rating a building by comparing it to a standard. Some owners and managers collect energy data for their entire portfolio of buildings, calculate the Energy Use Intensity (EUI), which is energy consumed per square foot, and then choose a baseline as the year with the highest consumption.
BTU	British Thermal Unit (a common unit of measure for natural gas use and heat output)
CFL	Compact Fluorescent Light
EMCS	Energy Management Control Systems-a computer-aided system used to monitor, control, and optimize the performance of HVAC, lighting systems, and equipment.
Energy Efficiency	Energy Efficiency is using less energy to provide the same level of energy service.
Energy Reduction	Energy Reduction is the change in a building's Energy Use Intensity (EUI) for two periods.
ENERGY STAR Portfolio Manager	ENERGY STAR Portfolio Manager allows you to track energy and water use trends as compared with the costs of these resources. It allows you to compare costs savings across buildings and shows the calculated cost savings for a specific project. Portfolio Manager will generate a Statement of Energy Performance for each building summarizing energy information and building characteristics such as site and source intensity.
ESCO	Energy Services Company
EUI	Energy Use Intensity - a unit of measurement that describes a building energy use. EUI represents the energy consumed by a building relative to its size and values are presented in kBtu/ft^2.
HVAC	Heating, Ventilation and Air Conditioning

kBtu	One thousand BTUs
LED	Lighting utilizing Light-Emitting Diode technology.
SEER	Seasonal Energy Efficiency Ratio is used to measure efficiency of air conditioners.
T-5	The third generation of troffer fluorescent lighting. T-5 fixtures are the smallest and most efficient of the troffer lights.
T-8	The second generation of troffer fluorescent lighting.
T-12	The first generation of troffer fluorescent lighting. T-12 fixtures are the largest and least efficient of the troffer lights.
Retro-commissioning	Retro-commissioning is a systematic and documented process for identifying low-cost/no-cost improvements that can boost the efficiency and performance of an existing building.