

October 29, 2010

Update

Strategic Energy Plan (StEP)

For

Arkansas State Highway and Transportation Department
10324 Interstate Highway, Little Rock

Fiscal Year 2010

Energy Manager

Ralph J. Hall
Assistant to the Director
P.O. Box 2261
Little Rock, AR 72203

Telephone: 501-569-2612

E-mail: ralph.hall@arkansashighways.com

Arkansas State Highway and Transportation Department

Strategic Energy Plan

The Arkansas State Highway and Transportation Department is given the mission “To provide a safe, efficient, aesthetically pleasing and environmentally sound intermodal transportation system for the user”. To achieve this, the Department’s staff continually reviews its cost structure, especially those operating costs related to energy consumption, i.e., electricity, natural gas and fuel for equipment operations. Other savings in energy consumption have been achieved through the selection of materials specified in highway construction and maintenance. These savings have been implemented through design and specifications that have generally produced acceptable to superior performance at reduced costs.

The Governor’s Executive Order 09-07 seeks a 20% reduction in energy consumption as a cost savings for state government. It is also intended to preserve the environmental beauty of Arkansas and to assist in national security by reducing our dependence on foreign oil. The Executive Order encourages all constitutionally-independent agencies to voluntarily participate in and comply with the provisions of the Order. In compliance with Executive Order 09-07, the Arkansas State Highway and Transportation Department hereby establishes the AHTD Strategic Energy Plan.

The AHTD Strategic Energy Plan addresses all areas of internal operations, construction and maintenance. Actions in the Plan will detail recent achievements in energy savings and current activities that are aimed to reduce energy consumption. In addition, new programs will be explored that have potential for cost savings through continued energy use reductions. Specific areas to be examined for meeting these goals are:

- Building Operations

- Fuel consumption

- Computer Power Management

- Recycling in Department Operations and in Construction and Maintenance

- Training and Education for energy conservation

This Plan is presented as a living document that will be in need of continual review and update as achievements are made and goals are met and as new energy saving technology is developed.

Energy Plan Element No 1

Building Operations

Ray Gruver, Facilities Management Section Head

Phillip Watkins, Building Management Section Head

Goal 1: Reduce the Department's annual building operations budget devoted to energy consumption (usage) in accordance with Executive Order 09-07 and Act 1494 of 2009.

Strategy 1.1: Collect annual energy usage data for 289 facilities owned by the Department (*To be completed by April 1, 2010*)

Objective 1.1.1: The collection and periodic monitoring of detailed data on the Department's annual energy usage for each facility will be the responsibility of the manager for each facility. The data will be recorded on the Arkansas StEP Facility Data Sheet (Excel workbook) for Fiscal Year 2008 and Fiscal Year 2009. An analysis will be made of the two years to determine if usage is tracking up or down for each facility.

Each District is now documenting the energy consumption for each building under their control and entering this information directly into the Facility Data Sheet provided by the Star Portfolio Manager. This work began September 1, 2010.

Objective 1.1.2: For data collection and future reporting purposes, the data collection worksheets will be completed and submitted to the Green.Arkansas.gov website before April 1, 2010.

Energy usages for all of AHTD's facilities have been entered in to the EPA's Energy Star Portfolio Manager and is being tracked. Training of the District's personnel will begin in July 2010; this will allow the District's to enter and track their own energy consumptions.

Strategy 1.2: Incorporate energy efficiency considerations into new construction or renovation projects (*To be fully implemented by July 1, 2010*)

Objective 1.2.1: Build to high efficiency standards as per legislation, Act 1494

Objective 1.2.2: Provide details on all new construction projects that will be started in the next year and note if life-cycle cost analysis was used to reduce water, energy, and other utilities, in compliance with Act 1494

Objective 1.2.3: Provide details on all major renovation projects that will be started in the next year and plans to comply with Act 1494.

The West Memphis Welcome Center, which is now under contract, was designed to the high efficiency standards using materials with highest allowable R-values and the HVAC system that incorporates ground-coupled heat pumps. The two new Area Headquarters (Arkansas County and Garland County) are being designed with high efficiency lighting, greater R-value insulation, thermally efficient double-pane windows and an HVAC system utilizing heat pumps. Due to these facilities being all new structures a comparable life-cost analysis was not performed.

Strategy 1.3: Building Envelope – The Department will evaluate each existing facility envelope for energy conservation measures (*Begin evaluations – 289 buildings -- by July 1, 2010*)

Objective 1.3.1: Install insulation where needed

Objective 1.3.2: Install storm windows and doors where appropriate

The Districts are in the process of adding additional insulation to the Department's 86 Area Headquarter Buildings. Additional insulation is being installed in the ceilings, walls and the large garage doors. Replacement of the windows and the passage doors with double-pane insulated windows and insulated doors will be the next projects.

Strategy 1.4: Lighting Systems – The Department will establish or reinforce policies and practices that will reduce energy consumption attributable to lighting systems, including, but not limited to the following:

(Current light replacement projects will be on a continuing basis)

Objective 1.4.1: Policies that ensure lighting systems are turned off during non-operating hours

New policies are being developed by the Department's Administration to insure only the minimum amount of lighting required for security will remain lit during non-operating hours.

Objective 1.4.2: Convert to more energy-efficient lighting systems and bulbs via compact fluorescent lamps (CFLs) etc.

All incandescent bulbs have been replaced with energy-efficient compact fluorescent lamps.

Objective 1.4.3: Use of occupancy light sensors to prevent energy waste in unoccupied areas and/or buildings, along with copy rooms, conference rooms, etc.

A project is being implemented to install occupancy sensors in all of the twenty-two (22) Central Office Building's restrooms, which will be expanded to include the Planning Building restrooms, the Annex Building restrooms, copy rooms, conference rooms, hallways and private offices, as funds become available.

Objective 1.4.4: Maximize use of natural lighting whenever possible and consistent with temperature control

Facilities Management is investigating the feasibility of installing a web-based lighting control system that could reduce lighting levels (dim) when sufficient natural light is present and would control all lighting functions, as to occupancy, durations, dimming and enforcement of any lighting policies.

Objective 1.4.5: Install light emitting diode (LED) lighting where practical.

The elevator lobbies on the tenth floor and basement have been retrofitted with LED lamps which cut the power consumption by 52% and a project is underway to replace the T12 lamps in the nine remaining lobbies with the LED lamps.

Strategy 1.5: Central Plant – evaluate central plant for energy conservation opportunities (Evaluation completed by July 1, 2010)

Objective 1.5.1: Perform an energy engineering study for recommendations

An energy audit was conducted on the central office complex. The audit contains information on energy saving possibilities for lighting, VFD's, and replacement of antiquated HVAC equipment with new higher efficiency equipment.

Objective 1.5.2: Install or optimize air and water economizers

We are using current building automation system to optimize outside air intake for free cooling where conditions allow. We are controlling outside air dampers to maintain fresh air requirements as well as to reduce load on building air conditioning. We also have gathered information on the cost to purchase plate and frame heat exchangers to reduce the need for chillers during winter months, as well as possible energy savings.

Objective 1.5.3: Installation of Variable Frequency Drives (VFD) on pumps

The department will continue to install (VFD)'s during renovations, new construction, and retrofit of antiquated equipment. The installation of VFD's on new equipment is already being done on larger equipment.

Objective 1.5.4: Installation of thermal energy storage

We have researched the use of Ice building thermal energy storage (which is a technology that has been around for many years) for use in this facility, but found that it would be a costly complete retrofit of our entire HVAC system. If funds become available we can look further into the use of thermal energy storage.

Objective 1.5.5: Replace antiquated chiller plant with high efficiency model

The department recently replaced 2 antiquated centrifugal chillers with higher efficiency Carrier screw chillers and we plan to replace the 2 remaining chillers when funds become available.

Strategy 1.6: Heating, Ventilation, and Air Conditioning Systems – measures will be established to ensure that Heating, Ventilation, and Air Conditioning (HVAC) systems are optimized to operate at reduced levels during non-operating hours (*Completed by July 1, 2010*)

Objective 1.6.1: Implement schedules to control HVAC systems

We currently use our building automation system to set up schedules on most of our building. We have optimized the system to allow all building HVAC to be scheduled off during unoccupied conditions.

Objective 1.6.2: Set/adjust timers for air conditioning, etc.

Controlled by building automation system.

Objective 1.6.3: Install or expand energy management / building automation systems

During the renovation of old buildings, or the construction of new, the HVAC is added into our current database of automated buildings.

Objective 1.6.4: Life-cycle cost approach will be used where possible to develop specifications to ensure the purchase of energy efficient or Energy Star rated equipment and appliances.

During design of remodels or new construction projects, information is gathered on equipment to be used in the project. This information is used in job specification to ensure we are buying the most cost effective equipment for the specific application.

Strategy 1.7: Water Conservation In Existing Facilities (*Assessments and repairs will be completed by July 1, 2010*)

Objective 1.7.1: Baseline water usage

Information is currently being gathered and tracked by Facilities Management.

Objective 1.7.2: Identify water conservation opportunities

Steps will be taken to replace bathroom fixtures with water saver fixtures equipped with automatic regulated flush valves to reduce water consumption during a remodel or when funds become available.

Objective 1.7.3: Assess and prioritize opportunities

Our primary focus will be on bathroom water usage and steps will be taken to ensure that we purchase equipment capable of meeting our requirements.

Objective 1.7.4: Repair leaky faucets

Frequent visual inspections for water leaks are being made to ensure that water is not being wasted.

Strategy 1.8: Enhance preventative and routine maintenance procedures to maximize energy efficiency

Objective 1.8.1: Perform filter changes for HVAC systems at regular intervals

A preventive maintenance program is now in place to ensure filters are changed, bearings are lubricated, and coils are cleaned on HVAC equipment on a regular basis to ensure proper operation.

Objective 1.8.2: Perform regular inspections for water and pneumatic leaks

Most of our pneumatic system has been replaced with Direct Digital Control (DDC) therefore most pneumatics are not being used. However we do still maintain our compressors, air dryers, and filters for the pneumatics still in service.

Objective 1.8.3: Recommission high energy use equipment

We are just now completing the replacement of our antiquated steam boilers with high efficiency hot water boilers. Plans are to replace the remaining high- energy use equipment when funds become available.

Strategy 1.9: Integrate energy considerations into cleaning / janitorial activities (*Complete evaluation and implementation by July 1, 2010*)

Currently our cleaning is handled by a bid contract and changes made at this time could effect the contract requirements.

Objective 1.9.1: Evaluate need for / frequency of various cleaning activities

Objective 1.9.2: Utilize cleaning products that reduce energy and water consumption

Energy Plan Element No. 2

Fuel Consumption

Danny Keene, Equipment and Procurement Division Head

Goal 2: Reduce the agency's overall annual fuel consumption for the operation of its vehicle fleet and the off-road equipment and explore alternative fuel options.

Strategy 2.1: Fleet Fuel Efficiency: Collect annual energy usage data for vehicle fleet owned by the Department in order to improve fleet vehicle efficiency. Included will be the annual average mileage of fleet, number of vehicles in fleet, and age of vehicles in fleet. *(Complete data collection by July 1, 2010 and continue with on-going evaluations.)*

Objective 2.1.1: Department has two types of vehicles, on-road and off-road. The on-road equipment will be divided into class of vehicles, i.e. sedans, pick-ups, dump trucks, etc.

See following "Fleet Distribution Summary"

Fleet Distribution Summary - 2010

<u>ON-ROAD EQUIPMENT</u>	<u>ACTIVE TOTAL</u>	<u>AVERAGE AGE</u>
Autos	260	3.5
Carryalls	7	2.4
Vans	18	4.2
Pickups	1,157	3.9
Dump Trucks (Gas)	1	.0
Dump Trucks (Diesel)	788	12.6
Tractor Trucks (Diesel)	51	14.1
Misc. Trucks	300	6.6
Asphalt Distributors	39	15.3
Concrete Mixers	6	19.0
Truck-Mounted Units	54	12.0
Trailers	437	14.5
TOTAL ROAD	3,118	8.2

<u>OFF-ROAD EQUIPMENT</u>	<u>ACTIVE TOTAL</u>	<u>AVERAGE AGE</u>
Crawler Tractors	25	16.5
Motor Patrols	179	23.4
Loaders	122	18.3
Cranes	8	27.5
Hydraulic Excavators	30	12.4
Rollers	157	16.0
Wheel Tractors (Gas)	3	30.0

Wheel Tractors (Diesel)	303	15.3
Backhoes	159	9.5
Mowing Equipment	597	11.5
Asphalt Equipment	125	12.6
Concrete Equipment	62	12.0
Sweepers	130	9.1
Spreaders	409	15.5
Marine Equipment	20	28.0
Compressors	68	14.6
Generators-Welders	79	12.2
Water Pumps	15	23.1
All Other Equipment	102	16.2
TOTAL OFF ROAD	2,593	14.4
<hr/>		
TOTAL MAJOR EQUIPMENT	5,711	11.0
<hr/>		
	-316 (Sold at October 2009 Auction)	
TOTAL ACTIVE MAJOR EQUIPMENT	5,395	

Objective 2.1.2: Determine annual miles per gallon of the vehicle fleet in each class currently as a benchmark

See following “Average Miles Per Gallon (On-Road Equipment Codes)”

[Average Miles Per Gallon \(On Road Equipment Codes\)](#)

<u>Code</u>	<u>Description</u>	<u>2009 Benchmark</u>	<u>2010 Avg. MPG</u>
002	Auto, Police Pursuit	14.77	15.34
004	Auto, Mid-Size	22.81	25.54
005	Carryalls	16.49	21.79
007	Vans	16.18	23.96
009	Compact Pick-up Truck	19.42	20.74
010	1/2 T, 2WD	15.80	16.09
011	1/2 T, 4WD, Ext. Cab	14.28	14.15
012	3/4 T, 2WD	11.61	11.42
013	3/4 T, 4WD	11.76	11.29
014	Crew Cab Gasoline	9.92	10.13
016	1 T, Gasoline	10.08	13.7
017	Ext. Cab Gasoline	14.11	14.4

020	Truck, Flatbed, Stakebed, Van or Svc. Body 1 T	8.55	8.82
021	Truck, Flatbed, Stakebed, Van or Svc. Body 3/4 T	10.80	11.48
024	Crew Cab Flatbed	7.80	7.49
032	6 Cu. Yd, Dump Truck	8.12	8.24
034	6 Cu. Yd, Dump Truck, Auto. Trans.	6.99	6.96
036	10 Cu. Yd, Dump Truck	6.54	6.2
038	10 Cu. Yd, Dump Truck, Auto. Trans.	5.70	5.66
039	Flatbed 12'	7.84	6.88
042	Crew Cab	8.46	9.11
044	Crew Cab w/Ejecto Body	9.22	9.36
051	Flatbed, Van Body, Gasoline	7.93	N/A
057	Flatbed, Van Body, Diesel	7.58	7.4

Objective 2.1.3: When replacing vehicles, consider fuel efficiency for the vehicles' intended use

The Department is now specifying Mid-Size Sedans and as many ½ Ton 2WD Pickups with better fuel economy ratings as possible.

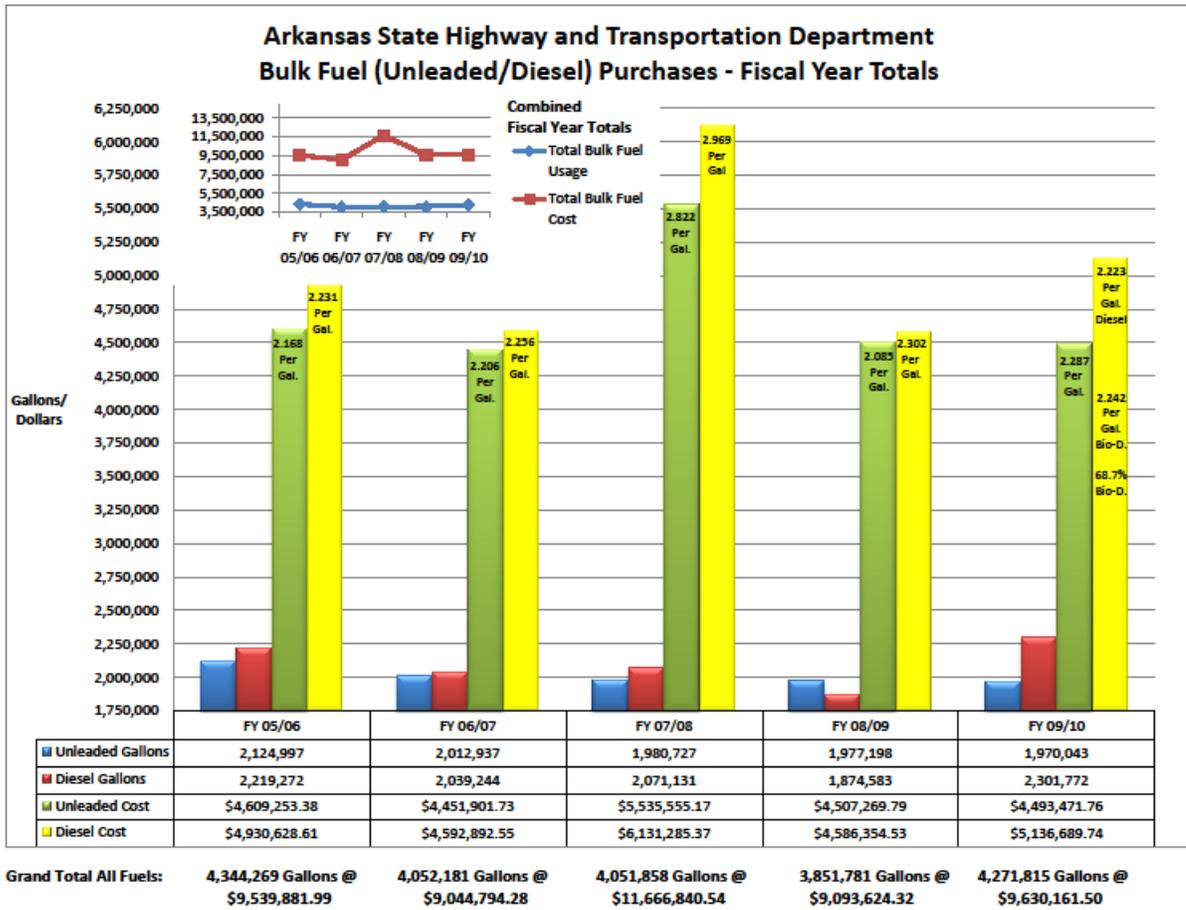
Objective 2.1.4: Determine annual miles per gallon of the vehicle fleet in each class after future purchases of more fuel efficient vehicle(s)

The Department's comprehensive Equipment Management System tracks all equipment usage, mileage, and fuel consumption. The Department will continue to prepare 2.1.1 "Average Miles Per Gallon" Report and compare to FY2009 and FY2010 Benchmark Reports.

Strategy 2.2: Reduce Fuel Consumption: Improve operational efficiency to reduce fuel consumption in the Department's vehicle fleet. *(Provide data and graphs for initiatives by July 1, 2010.)*

Objective 2.2.1: Document fuel savings from past and current initiatives

See following "Fleet Consumption–Bulk Fuel Purchases" Report (FY2006 – FY2010)



Objective 2.2.2: Reinforce existing and develop new policies for carpooling in agency vehicles where appropriate when performing assigned tasks

The Department will continue to reinforce policies encouraging carpooling.

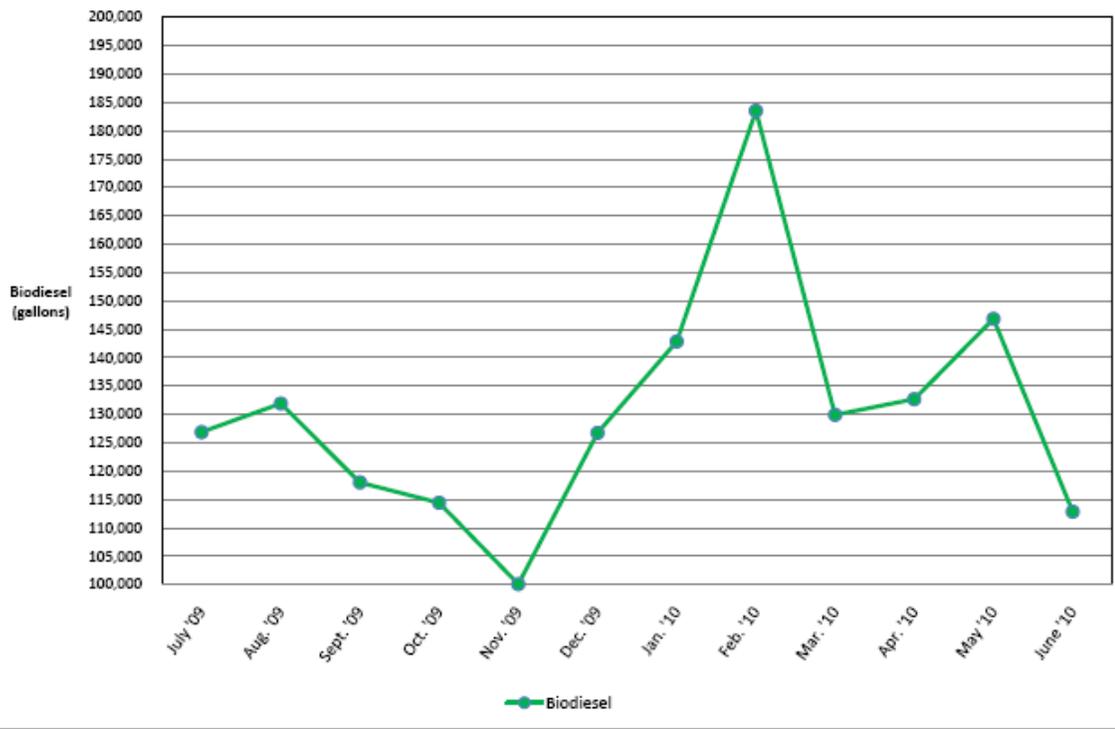
Objective 2.2.3: Promote the purchase by our purchasing agents of bio-based products, as required by Act 542 of 2005

The Department has enacted a system to ensure quotes from fuel suppliers that offer bio-based products when we are resupplying our fuel stocks.

Objective 2.2.4: Monitor and report the progress of biofuel purchases in accordance with the Arkansas Alternative Fuel Development Act (ACA 15-13-201)

The following are “Biodiesel Purchases” Reports/Graphs (FY2009 & FY2010) and Administrative Order 2009-3 establishing Department policy in accordance with § A.C.A. 15-13-201 et seq.

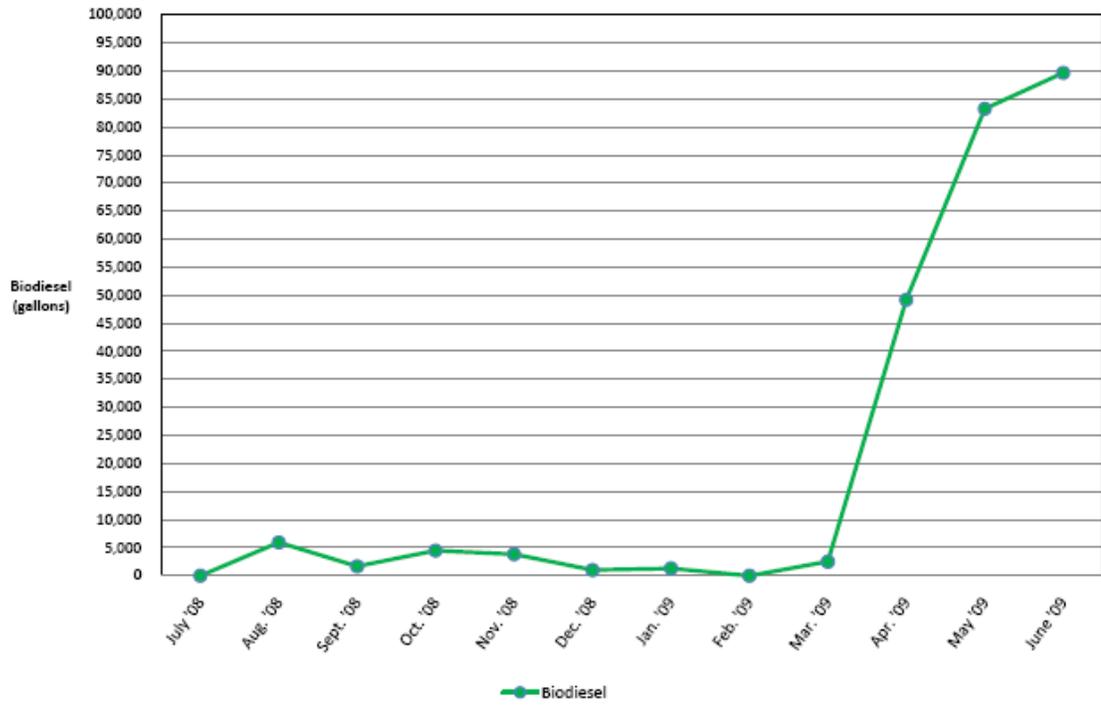
Arkansas State Highway and Transportation Department Biodiesel Purchases - Fiscal Year 09/10



	July '09	Aug. '09	Sept. '09	Oct. '09	Nov. '09	Dec. '09	Jan. '10	Feb. '10	Mar. '10	Apr. '10	May '10	June '10
Biodiesel	126,887	131,918	118,023	114,452	100,092	126,741	142,861	183,508	129,939	132,684	146,841	112,873
	59.7%	70.1%	59.4%	68.2%	59.8%	72.2%	67.3%	72.2%	64.9%	76.4%	80.3%	67.0%
Diesel	85,818	56,141	80,635	53,433	67,218	48,901	69,001	70,605	70,215	41,037	36,036	55,713

*Purchases complying with minimum 2% biofuels by volume for all diesel purchases.

Arkansas State Highway and Transportation Department Biodiesel Purchases - Fiscal Year 08/09



	July '08	Aug. '08	Sept. '08	Oct. '08	Nov. '08	Dec. '08	Jan. '09	Feb. '09	Mar. '09	Apr. '09	May '09	June '09
Biodiesel	-	5,936	1,666	4,472	3,814	1,000	1,300	-	2,500	49,191	83,249	89,650
	0%	3.5%	.9%	2.2%	2.3%	.6%	.7%	0%	1.8%	27.2%	49.9%	50.6%
Diesel	230,478	164,540	182,277	197,996	159,784	167,891	177,534	152,524	138,844	131,633	83,456	87,626

*Purchases complying with minimum 2% biofuels by volume for all diesel purchases.

ARKANSAS STATE HIGHWAY AND TRANSPORTATION DEPARTMENT

LITTLE ROCK, ARKANSAS

March 20, 2009

ADMINISTRATIVE ORDER 2009-03

TO: District Engineers and Division Heads

SUBJECT: Arkansas Alternative Fuel Development Act
Arkansas Code Annotated §15-13-201 et seq.

In accordance with the above referenced Arkansas Alternative Fuel Development Act and as directed by the Department of Finance and Administration to develop a directive to comply with the standard of biofuel usage, the following policy is effective immediately:

POLICY

When available and economically feasible, the Arkansas State Highway and Transportation Department is required to purchase diesel fuel that contains at least a minimum of two percent (2%) biofuels by volume for all diesel powered motor vehicles, light trucks, and equipment.

Requirements: The Department will adhere to the requirements of the following provision of State Law:

A.C.A. §15-13-202. Biofuel Standard for State Vehicles and State Equipment. All diesel-powered motor vehicles, light trucks, and equipment owned or leased by a state agency shall be operated using diesel fuel that contains a minimum of two percent (2%) biofuel by volume.

Variances: The Department is allowed a waiver for a variance from the above biofuel standard, as set forth below:

A.C.A. §15-13-203. Allowances for Variance of the Biofuel Standard. A waiver for a variance from the biofuel standard under §15-13-202 may be granted if one (1) or more of the following is demonstrated:

- (1) The cost of diesel fuel that is blended with biofuel exceeds the cost of diesel that does not contain biofuel by fifteen cents (15¢) per gallon or more;*
- (2) Diesel fuel blended with biofuel is not available for purchase in the geographic region; or*
- (3) Compliance with the biofuel standard is not economically feasible.*

Implementation: This new policy should be made available to all employees, under your supervision, involved in the securing of bids for bulk fuel. District Engineers and the Division Head of Equipment and Procurement are advised that Fuel Clerks should continue to follow the procedures for purchasing of diesel fuel as outlined under "Purchase of Fuel and Lubricants".

Strategy 2.3: Materials, Products and Services: The Department will revise existing or develop new standards, criteria and specifications for purchasing materials, products or services which:
(Implement by July 1, 2010)

Objective 2.3.1: Align with the Environmental Protection Agency's Energy Star Qualified Products program

The Department will specify EPA "Energy Star" Qualified Products, when applicable.

Objective 2.3.2: Express a preference for the purchase of products that are made from, and/or packaged with, recycled materials, and products that are, themselves recyclable in whole or in part

The Department will specify products and/or packaging that are made from recycled materials, in whole or in part, when applicable.

Energy Plan Element No. 3

Computer Power Management *Bryan Stewart, Computer Services Division Head*

Goal 3: Reduce the Department's energy consumption through a Computer Power Management Program

Strategy 3.1: The Department will identify and begin implementation of three (3) initiatives to reduce power consumption in the data center or server room. (*Begin implementation by July 1, 2010.*)

Objective 3.1.1: Develop and document initiatives

Both previously identified and new opportunities to reduce power consumption in the data center, wiring closets and server room are now being documented on an ongoing basis. Some major accomplishments to meet this objective are:

1. Data Center Consolidation – Completed in July 2010, the consolidation enabled the elimination of one 15 ton air conditioning unit resulting in savings of about 322,589 kWh per year.
2. Network Consolidation – 90% complete in October 2010. Target completion is the end of November 2010. The estimated energy savings are approximately 38,222 kWh per year.
3. Server Virtualization – The team has researched and piloted various vendors' server virtualization software and will select a solution in the near future. A server needed for this project was purchased in October 2010. After installation and testing of the chosen software is complete the migration of servers to a virtual environment should begin around March 2011.
4. PBX Telephone System replacement – The team is researching the energy savings potential and feasibility of replacing the Department's central office PBX.
5. Storage Area Network (SAN) Consolidation – The team has recently begun researching the energy savings potential of consolidating SANs.

Objective 3.1.2: Document plans to implement initiatives

A team consisting of the Computer Services Division Head, Network Manager, and Engineering Manager meet periodically to discuss the initiatives and the team's progress in accomplishing various energy savings tasks. Documentation of the plans is an ongoing task.

Objective 3.1.3: Develop a means to measure power consumption relative to work output, for example with metered rack power distribution units

An APC InfraStruXure produces a variety of power consumption reports for various networking equipment, storage devices and servers. It's estimated that 60-70 percent of the equipment that can be moved to this platform has been moved. The target completion date for moving the remaining equipment is June 2011.

Objective 3.1.4: Develop administrative policies that support green initiatives

The staff responsible for evaluating, selecting and purchasing servers, network equipment and storage devices was instructed to consider energy savings in their evaluations and, where practical to do so, to purchase the highest rated energy star equipment available for the data center.

Policies have been developed and employees responsible for data center operations have been verbally instructed to comply with the policies.

Strategy 3.2: The Department will identify and begin implementation of three (3) initiatives to reduce power consumption in the office and support areas. (*Begin implementation by July 1, 2010.*)

Objective 3.2.1: Develop and document initiatives

Both previously identified and new opportunities to reduce power consumption in office and support areas are being documented on an ongoing basis. Some major accomplishments to meet this objective are:

1. Flat Panel Display Power Management – The team has completed setting flat panel display power management settings for energy savings on existing and newly purchased flat panel displays.
2. Desktop Computer Power Management – The team has researched three power management solutions for desktop computers to manage the energy settings and to automatically power computers off at night and weekends, and power them on for backups. A solution will be selected soon.

(See 3.3.2 for information regarding data backup issues that prevent us from immediately being able to manage the power of some computers).

3. Desktop Virtualization – The team will research desktop virtualization software and select a solution for a future pilot.

Objective 3.2.2: Develop a power consumption model for office and support area assets

A power consumption model for computers and printers is complete. A model for other office equipment such as copiers, scanners and fax machines remains to be developed.

Objective 3.2.3: Develop administrative policies that support green initiatives

In order to take the burden off the end user, enforcement of administrative policies will be handled through equipment management software as much as possible. For remote employees with limited to no network connectivity, policies and/or best practices are being communicated through the Department's "Going Green" training program and "CenterLine" newsletter.

Strategy 3.3: Computer Equipment – The Department will establish policies and practices designed to ensure that all electrically-powered equipment, including computer equipment, is turned off when not in use, and that personal computers and printers are configured with default settings that ensure that computers and printers go into "sleep mode" after 30 minutes or less of non-use. (*Begin implementation by July 1, 2010.*)

Objective 3.3.1: Purchase ENERGY STAR computers, printers, copiers, etc.

The staff responsible for evaluating, selecting and purchasing office printers, computers and related office hardware was instructed to consider energy savings in their evaluations and, where practical to do so, to purchase the highest rated energy star equipment available.

Objective 3.3.2: Set timers for computers to go into sleep mode after 30 minutes or less of non-use

The Engineering Section currently backs up individual engineering workstations after hours which prevent us from turning those computers off after hours. Due to the high volume of data being backed up, the process currently has a 10 hour window Monday through Thursday and a 50 hour window for the full backup starting on Friday. The Engineering Section is working to change the backup process so that the computers can be turned off in the evenings and weekends. Products and processes are being researched and planned. We are about 3 months from starting the change.

Objective 3.3.3: Implement virtual server technology or other innovative energy savings computer management actions

The team has researched and piloted various vendors' server virtualization software and will select a solution in the near future. A server needed for this project was purchased in October 2010. After installation and testing of the chosen software is complete the migration of servers to a virtual environment should begin around March 2011.

Strategy 3.4: Paper Usage – The Department will establish policies and practices designed to reduce the use of paper, including but not limited to: (*Develop policies and practices by July 1, 2010*)

Objective 3.4.1: Minimize the use of personal on-desk printers

The Computer Services Division's staff now reviews each request for a personal printer to determine whether or not a workgroup printer is available and whether or not the request for a personal printer is justified.

Objective 3.4.2: Establish multi-user print stations that include printers, copiers, and scanners

Multi-user print stations are being installed throughout the Department as new printers are being requested. Many of these devices are multi-function too (printer, scanner, copier and fax) units.

Objective 3.4.3: Explore the use of duplexer add-ons to printers which will automatically print dual-side prints of multi-page documents

The team evaluated duplex add-ons to existing printers and deemed them to be an expensive, inefficient solution. The team's preference is to add duplexing capability at the time of the printer's replacement. All new workgroup class printers are now duplex capable and are set to duplex by default.

Objective 3.4.4: Encourage users to use the setting of typeface fonts and default page margins in word-processed or other agency-printed documents, so as to maximize paper use

Recommendations will be added to the Department's "Going Green" training program.

Objective 3.4.5: Encourage the use of electronic, "paperless" communication between agency employees, in lieu of printed materials.

The Department's "Going Green" training program now encourages paperless communications between agency employees. Many reports and manuals are now being produced and distributed electronically.

Energy Plan Element No. 4

Recycling in Department Operations and in Construction and Maintenance

Emanuel Banks, Assistant Chief Engineer – Operations

Tony Sullivan, State Maintenance Engineer

Goal 4: Promote Department operations and practices that will reduce, to the extent practicable, the environmental impact of the agency's overall operation

Strategy 4.1: Construction and Maintenance – The Department will explore ways to minimize the use of natural resources in its construction and maintenance activities.

Objective 4.1.1: Review and report the Department's existing specifications and design criteria that make use of recycled materials in the construction and maintenance activities

STANDARD SPECIFICATIONS

Allows the use of existing asphalt or granular roadway surface to be reused.

- **SECTION 210: EXCAVATION AND EMBANKMENT**

Allows the use of existing shoulder material to be reused.

- **SECTION 216: SCARIFYING AND RECOMPACTING SHOULDERS**

Allows the use of steel slag.

- **SECTION 303: AGGREGATE BASE COURSE**
- **SECTION 403: MATERIALS AND EQUIPMENT FOR PRIME, TACK, AND ASPHALT SURFACE TREATMENTS**

Allows the use of fly ash or ground granulated blast-furnace slag.

- **SECTION 307: CEMENT TREATED BASE COURSE**
- **SECTION 308: CEMENT STABILIZED CRUSHED STONE BASE COURSE**
- **SECTION 309: PORTLAND CEMENT CONCRETE BASE**
- **SECTION 501: PORTLAND CEMENT CONCRETE PAVEMENT**
- **SECTION 802: CONCRETE FOR STRUCTURES**

Allows the use of up to 30% reclaimed asphalt pavement in any type mixture specified in Sections 405, 406, 407, and 417.

- **SECTION 405: ASPHALT CONCRETE HOT MIX BASE COURSE**
- **SECTION 406: ASPHALT CONCRETE HOT MIX BINDER COURSE**
- **SECTION 407: ASPHALT CONCRETE HOT MIX SURFACE COURSE**
- **SECTION 416: RECYCLED ASPHALT PAVEMENT**
- **SECTION 417: OPEN GRADED ASPHALT BASE COURSE**

Allows the use of used material for temporary drainage structures or temporary bridges.

- **SECTION 603: MAINTENANCE OF TRAFFIC AND TEMPORARY STRUCTURES**

Allows the use of reclaimed asphalt pavement.

- **SECTION 412: COLD MILLING ASPHALT PAVEMENT**

SPECIAL PROVISIONS\SUPPLEMENTAL SPECIFICATIONS

Allows use of recycled Portland Cement Concrete Pavement as aggregates for Aggregate Base Course.

- **SP: Removing Existing Portland Cement Concrete Pavement**

Allows use of Recycled Asphalt Shingles manufactured waste to be used in Asphalt Concrete Hot Mix.

- **SP: Recycled Asphalt Shingles**

Allows use of Warm Mix Asphalt by Change Order.

Objective 4.1.2: Evaluate the planning and design criteria used in construction and maintenance of state highways in-order to emphasize minimal impact on the environment and natural resources

**RECYCLED MATERIALS USED, PURCHASED, OR MANUFACTURED
CALENDAR YEARS 2002- 2009**

	ALUMINUM SIGN BLANKS		PAINT BARRELS RECYCLED	
	SF	AMT.	QTY.	
2002	26,346.5620	\$10,706.71	6,005	
2003	25,207.0562	\$8,551.43	6,691	
2004	11,422.7709	\$4,387.43	5,878	
2005	16,426.5450	\$6,164.58	3,962	
2006	26,847.8549	\$10,465.86	2,402	
2007	10,926.6425	\$4,371.45	3,183	
2008	9,948.2500	\$3,847.61	3,771	
2009	28,416.1875	\$11,416.68	3,730	
TOTAL	155,541.8690	\$59,911.75	35,622	

	6' STEEL SIGN POSTS		12' STEEL SIGN POSTS	
	QTY.	AMT.	QTY.	AMT.
2002	33,450	\$117,890.52	70,401	\$716,013.91
2003	21,200	\$76,107.51	54,850	\$566,044.77
2004	40,001	\$183,281.87	54,150	\$693,835.60
2005	28,893	\$172,375.12	59,898	\$1,018,254.34
2006	22,722	\$129,428.49	17,500	\$298,000.47
2007	23,961	\$184,636.13	26,344	\$564,775.49
2008	22,740	\$200,179.77	24,162	\$610,672.28
2009	17,750	\$178,048.20	31,097	\$869,418.97
TOTAL	210,717	\$1,241,947.61	338,402	\$5,337,015.83

	GLASS BEADS FOR STRIPING		COLD MILLED ASPHALT	
	LBS.	AMT.	SQ. YDS.	AMT.
2002	2,771,700	\$616,452.61	991,500	\$495,750.00
2003	2,817,200	\$626,597.90	1,492,000	\$746,000.00
2004	2,685,100	\$1,403,444.44	964,900	\$482,450.00
2005	1,937,500	\$489,020.10	1,137,300	\$568,650.00
2006	793,200	\$245,433.42	1,117,500	\$558,750.00
2007	1,540,000	\$454,969.70	1,013,900	\$506,950.00
2008	1,848,000	\$546,143.64	1,053,400	\$526,700.00
2009	1,628,000	\$481,126.54	708,500	\$354,250.00
TOTAL	16,020,700	\$4,863,188.35	8,479,000	\$4,239,500.00

Objective 4.1.3: Prepare a list of recycled materials that have been researched and used in construction nationally or internationally and explore the use of these materials locally

APPLICATION – USE	MATERIAL
Asphalt Concrete – Aggregate (Hot Mix Asphalt)	Blast Furnace Slag Coal Bottom Ash Coal Boiler Slag Foundry Sand Mineral Processing Wastes Municipal Solid Waste Combustor Ash Nonferrous Slags Reclaimed Asphalt Pavement Roofing Shingle Scrap Scrap Tires Steel Slag Waste Glass
Asphalt Concrete – Aggregate (Cold Mix Asphalt)	Coal Bottom Ash Reclaimed Asphalt Pavement
Asphalt Concrete – Aggregate (Seal Coat or Surface Treatment)	Blast Furnace Slag Coal Boiler Slag Steel Slag
Asphalt Concrete – Mineral Filler	Baghouse Dust Sludge Ash Cement Kiln Dust Lime Kiln Dust Coal Fly Ash
APPLICATION – USE	MATERIAL
Asphalt Concrete – Asphalt Cement Modifier	Roofing Shingle Scrap Scrap Tires
Portland Cement Concrete – Aggregate	Reclaimed Concrete
Portland Cement Concrete – Supplementary Cementitious Materials	Coal Fly Ash Blast Furnace Slag
Granular Base	Blast Furnace Slag Coal Bottom Ash Coal Boiler Slag Mineral Processing Wastes Municipal Solid Waste Combustor Ash Nonferrous Slags Reclaimed Asphalt Pavement Reclaimed Concrete Steel Slag Waste Glass

Embankment or Fill	Coal Fly Ash Mineral Processing Wastes Nonferrous Slags Reclaimed Asphalt Pavement Reclaimed Concrete Scrap Tires
Stabilized Base – Aggregate	Coal Bottom Ash Coal Boiler Slag
Stabilized Base – Cementitious Materials (Pozzolan, Pozzolan Activator, or Self-Cementing Material)	Coal Fly Ash Cement Kiln Dust Lime Kiln Dust Sulfate Wastes
Flowable Fill – Aggregate	Coal Fly Ash Foundry Sand Quarry Fines
Flowable Fill – Cementitious Material (Pozzolan, Pozzolan Activator, or Self-Cementing Material)	Coal Fly Ash Cement Kiln Dust Lime Kiln Dust

Objective 4.1.4: Emphasize and document energy conservation measures that are designed and constructed into city, county and state highway projects.

The Arkansas Highway and Transportation Department received a grant from the Arkansas Energy Office to install LED traffic signal lenses in 54 small communities in 2006. The lenses in 98 intersections were replaced in Job 012129 Traffic Signals LED Upgrade (Statewide) (Ph. I).

- Total estimated cost for this retrofit is \$356,000.
- Measured energy savings for these 98 intersections was 882,000 kWh per year or at 10 ¢ per kWh a savings of \$88,200 per year.

Based on the success of this effort, the Arkansas Highway and Transportation Department secured another grant from the Arkansas Energy Office through the American Recovery and Reinvestment Act of 2009 to complete the transformation of the remaining 348 intersections in Arkansas to LED lenses. This project, Job 012129 Traffic Signals LED Upgrade (Statewide) (Ph. II) is underway now.

- Total estimated cost for this retrofit is \$790,969.
- Estimated energy savings for these 348 intersections is 3,800,000 kWh per year or \$380,000 per year.
- Total estimated energy savings for both projects is 4,682,000 kWh per year or a total savings of **\$468,200 per year** over the 15 year life of the lenses.

Strategy 4.2: Recycling Program – The Department will re-emphasize its recycling program.
(Complete by July 1, 2010)

Objective 4.2.1: Re-emphasize the Department's recycling program for paper, steel, aluminum, and decommissioned IT hardware plus cabling (data and power) by 12/31/09

Periodic reminders will be made in newsletters and other Department correspondence to re-emphasize the Department's commitment to recycling programs.

Objective 4.2.2: Participate in any state-wide contracts for recycling of toner cartridges, electronics, and other items.

Toner cartridges are now returned to the manufacturer for recycling using labels provided with the toner cartridge. All electronic equipment and cabling is now recycled by transferring the items to the Department of Finance and Administration Marketing and Redistribution Center.

Objective 4.2.3: Participate in any statewide equipment and furniture recycling programs that may be established for items that have been replaced or otherwise taken out of service and may be utilized by other State agencies

The Department participates in a statewide equipment recycling program by conducting an equipment auction annually of old passenger vehicles, trucks and other equipment deemed obsolete or scheduled for replacement.

The Department participates in a furniture recycling program by transferring old or obsolete office furniture and other items to the Department of Finance and Administration Marketing and Redistribution Center.

Energy Plan Element No. 5

Training and Education

Ralph Hall, Assistant to the Director

Goal 5: Encourage a cultural awareness of energy usage through training and education for energy conservation

Strategy 5.1: Training / Culture of energy awareness – The Department will establish a training program for agency employees and building Energy Managers in order to ensure better understanding and support of Green Initiatives (Complete development of training program by July 1, 2010)

On June 25th, 2010, the Department's Training and Safety Section completed a powerpoint program entitled "Going Green" (shown as link in 5.1.1 and as attachment 5-A for printed copies) that is planned to be given in program to all 3600 of the Department's employees by June 30, 2011.

Objective 5.1.1: Establish a training program for the designated agency supervisory personnel, who will be responsible for monitoring and enforcing energy-efficiency measures within the agency

The training program “Going Green” will be presented to all supervisors along with their employees as part of the Department’s regular instructional programs for employee development. The energy conservation program will be provided to any Division/District and to any supervisor interested in more regular and intense instructions to their employees.



Objective 5.1.2: Create an Energy Team comprised of representatives from throughout the organization

The Department’s current Strategic Energy Team accurately represents the most significant energy users of the Department and will continue in this role for now:

Hall, Ralph	Assistant to the Director (Team Leader)
Banks, Emanuel	Assistant Chief Engineer-Operations
Sullivan, Tony	State Maintenance Engineer
Gruver, Ray	Facilities Management Section Head
Stewart, Bryan C.	Computer Services Division Head
Keene, Danny	Equipment and Procurement Division Head
Watkins, Phillip W.	Building Management Section Head

Objective 5.1.3: Create an energy policy to be implemented Department-wide

Under development

Objective 5.1.4: Hold regular meetings of the Energy Team to discuss Department-wide integration of strategic goals energy

The Department's Strategic Energy Team meets on an as needed basis to review progress and give guidance on energy saving functions under development.

Objective 5.1.5: Hold an informational seminar on energy efficiency.

The Departments Training and Safety Office has presented the newly developed energy conservation program to the Department's top management and has developed a formal schedule that will eventually be presenting the program to all 3600 employees.

Objective 5.1.6: Send out regular notices to employees on energy efficiency measures

The Department's Public Affairs Section has now included an "Energy Conservation Tips" article in each monthly edition of the newsletter, *The Centerline* (latest edition attached 5-B)



Strategic Energy Plan Reduces Energy Consumption

In May of 2009, Governor Mike Beebe issued an Executive Order requiring all existing state buildings to reduce energy consumption by twenty percent by 2014 and thirty percent by 2017.

As a result of that executive order and to make plans to comply with it, the AHTD has created a Strategic Energy Plan, and, formed a seven-member Energy Efficiency Team to guide the plan.

The Energy Team includes staff members from the following divisions: Administration, Operations, Maintenance, Facilities Management, Computer Services, and Equipment & Procurement. The team was established in May of 2009 and meets monthly to discuss energy management issues such as organization-wide energy use reduction policies, capital improvement plans, maintenance issues, among other things.

The commitment of the Department's Energy Efficiency Team is to make every effort to conserve energy and the state's natural resources. This commitment will be beneficial to the Department employees and taxpayers and will result in wise financial management and the saving of energy.

To monitor the Strategic Energy Plan, the Department will maintain accurate records of energy consumption and the cost of energy on a monthly basis. A review of the energy consumption and costs will be conducted annually at each AHTD facility and recommendations will be made for updating the energy program.

So what is included in the plan? The Department will establish or reinforce policies that will reduce energy consumption attributable to lighting systems, heating and air conditioning systems, computer systems and Department vehicles, just to name a few. As typical examples, the plan calls for policies that ensure lighting systems are turned off during non-operating hours and converting to more energy-efficient light bulbs. Regarding staff vehicles, staff will be encouraged to carpool to worksites and avoid excessive idling, among other things. These are just specific examples, the Energy Plan covers many areas.

The Department will encourage staff awareness for the program through training and education for energy conservation. As a part of that education awareness, beginning next month, the CenterLine newsletter will include tips you can use for energy consumption at work and at home. You'll recognize it as an energy plan tip by the leaf logo you see at left. We can all do our share and make the AHTD's Energy Plan a huge success!



2 • Regional Awards 4 • Promotions • Engineering Interns 5 • The Staff Minute
6 • Thompson Named CVSA Chair 7 • Health Program • Insurance Enrollment
8 • Construction • Around the Department 9 • August AHTD People 10 • September AHTD People

Objective 5.1.7: Set lights out and computer shut-down policies for end of day

Under development

Objective 5.1.8: Discourage excess driving, encourage carpooling, etc.

This is a prominent element in the training program "Going Green".