Arkansas Building Authority

Energy Reductions through Strategic Energy Planning

Successes & Lessons Learned

January 7, 2015

Clint Harper

- ABA Building Operations Administrator
- ABA Energy Manager
- 20 Years of Facilities Operations & Management

Energy Reductions are Intentional Acts

You don't climb mountains without a team, you don't climb mountains without being fit, you don't climb mountains without being prepared and you don't climb mountains without balancing the risks and rewards. And you never climb a mountain on accident - it has to be intentional.

- Mark Udall

Energy Reductions are Intentional Acts

If you don't know where you are going,
you might wind up someplace else.

- Yogi Berra

ABA Buildings

ABA is responsible for the management of thirteen (13) buildings. Twelve buildings are located within Little Rock, Arkansas. One building is located in Fort Smith, Arkansas.

Currently we have 1,287,525 Ft.^{2} as part of our portfolio.

ABA Buildings

Our buildings range in size from 290,401 ft.² Multi-Agency Office Buildings down to a 2,130 ft.² single tenant building.

Primarily our buildings are leased to government agencies as office space, but we also host tenants with critical operations such as data centers, and laboratories.

ABA
Before Act 1494 & EO 09-07

- Deferred Maintenance Planning that prioritized projects based on needs
- Began tracking monthly Energy Usage in FY 2000 through a Smart Expense Management contract
- Energy Conservation Policy established in 2001 (ABA Minimum Standards & Criteria Section 2-800)

ACT 1494

Act 1494: In 2009 the Arkansas Legislature enacted measures that directed the Arkansas Energy Office to develop a plan for reducing energy use in all existing state buildings by 20 percent by 2014 and a 30 percent reduction by 2017. According to the Arkansas Energy Office of the Arkansas Economic Development Commission, the state was spending on average $100 million annually on energy for state buildings, including public universities and colleges.

Executive Order 09-07

On May 28, 2009 Governor Mike Beebe issued Executive Order 09-07 to encourage the reduction of energy consumption by state agencies and the environmental impact of state agency operations. The Executive Order requires all executive branch agencies under the jurisdiction of the Governor to develop and submit individual Strategic Energy Plans (StEPs) with the following goals: Reducing each agency's annual agency maintenance and operating budget devoted to energy consumption, and Promoting agency operations and practices that will reduce, to the extent practicable, the environmental impact of the aency's overall operation.

ABA Strategic Energy Plan (StEP)

In October of 2009, Arkansas Building Authority established a Strategic Energy Plan as Required by EO 09-07 that put in place an energy team that would collectively work together to recommend energy policies. The plan set basic goals including but not limited to:

ABA Strategic Energy Plan (StEP)

- Complete StEP Facility Data Sheets for all ABA owned facilities
- Collect energy use data for all ABA owned facilities
- Promote policies that will reduce environmental impact by Agency.
- Develop or revise standard for purchase of materials, products, and/or services that express a preference for bio-based products or products utilizing recycled materials or packaging.
- Establish criteria to manage vehicle fleet for fuel efficiency.
- Establish and implement recycling program.

ABA Strategic Energy Plan Goals

- Lighting Systems: Establish and implement policies to reduce energy consumption attributed to lighting systems.
- Heating, Ventilation, Air Conditioning Systems: Establish and implement policies to reduce energy consumption attributed to HVAC systems.
- Perform energy audits on all ABA owned buildings (subject to availability of funding) by June 30, 2014.
- Retro-commission all ABA owned building energy systems (subject to availability of funding) by June 30, 2017.
- Integrate Energy Efficiency Into Capital Improvements
- Reduce total consumption 20% by 2014
- Reduce total consumption 30% by 2017

Challenges

- 20% Reduction by 2014
- 30% Reduction by 2017
- Funding

Getting Started

The **2010 ABA StEP** Plan noted 4 planned energy related projects for One Capitol Mall (Big MAC)that were to be completed within the year

- Replacement of Boilers
- Lighting Retrofit
- Replacement of Chillers
- Renovation of 5th Floor from State Library to Legislative space

One Capitol Mall
Big MAC Building

MAC

- The Multi-Agency Complex was built in 1979 to house numerous agencies, including the Arkansas State Library and the Arkansas Department of Computer Services (DIS). The MAC ‘s Boiler Room also supplied steam to the State Capitol and #2 Capitol Mall next door.
- The project included several energy conservation measures including but not limited to computerized controls, heat recovery chiller coupled with a designed maximum 130^0 hot water loop, poured in place ceramic fill cooling towers and lighting controls.

MAC Lighting

- In 2009 a lighting project took place to replace all remaining T-12 lamps and ballast with T-8 lamps and ballast. ABA elected to use a lighting system that was recommended in Entergy's 2009 Energy Seminar. The system incorporated high lumen lamps (3100 lumen) matched to low ballast factor ballast (.77).
- ABA received an incentive rebate from CleaResults and Entergy for $13,101.60.

MAC Boilers

By 2009 the State Capitol and #2 Capitol Mall had installed their own heating water systems and were no longer dependent on the MAC Boilers.

MAC
Boilers

- In 2009 a Boiler Replacement project took place that replaced the three (3) 150 HP low pressure steam boilers with 2 condensing boilers.
- New pumps with VFD's were installed on the hot water loop.
- The domestic water heater was also replaced with a condensing hot water heater.

MAC
Chillers

In 2005, the first of two studies was performed on the chilled water system. At that time the equipment had been in service for 26 years and was beginning to have issues.

The studies analyzed existing conditions and came up with options to revamp the existing plant with a design that would be reliable, efficient and operator friendly.

MAC Chiller Replacement Challenges

- Continue Operation During Construction
- Maintain Chilled water for critical needs
- Shutdown of facility while continuing critical/essential operations
- Maintain condensing water loop while performing upgrades to system
- Change over from pneumatic to electronic controls

MAC Chiller Replacement Challenges

- Equipment selections that would be both reliable and efficient
- Heat recovery that would be effective and user friendly to the operator
- Add additional cooling tower cell that would allow for isolating towers for maintenance while maintaining flow.
- User friendly controls

MAC Chillers

- Primary Chillers selected were two (2) 290 ton nominal capacity magnetic bearing chillers (CH-1 & CH-2)
- Redundant, cooling-only 150 nominal ton three (3) module, modular chiller (CH-3A)
- Heat recovery150 nominal ton, three (3) module, modular chiller (CH-3B)
- CH-3A&B's arrangement helped us meet the N+1 requirement for chilled water.

MAC
Cooling Towers

- The two existing cooling towers were constructed with a common basin making cleaning difficult.
- There were multiple single points of failure that could jeopardize the plant's ability to provide chilled water to critical areas.

MAC
Cooling Towers

- A third tower with high efficiency ceramic fill and separate basin was added to the existing structure.
- Ceramic fill was removed from the existing towers , new lintels installed, re-piped and fill put back in place.
- Direct drive fans with VFD's were installed in place of the 1750 RPM motors and gear boxes.

MAC
Chiller Plant Controls

The existing systems were controlled pneumatically.

Direct Digital Controls (DDC) were added as a part of the project. The DDC controls system proved to be very reliable compared to the existing system.

The new DDC also allowed for complex control sequences to be implemented without issue.

MAC
Chiller Project Team

- The project was a group effort requiring combined and intimate effort by the designer, contractor, controls contractor, ABA and Data Center Operations.
- Each part of the team was engaged when scheduling and working out the details of each shut-down and bringing systems on line.

MAC
Chiller Project Results

- The project was completed in June 2010 without disrupting the Data Center's services.
- The system met most of the special requirements set forth by ABA.
- Significant reduction in energy cost and consumption.
- 2014 ASHRAE Region VIII, Outstanding Regional Project Technology Award

DIS UPS Upgrades

- While the Chiller Project was taking place, DIS also replaced their UPS with more reliable and efficient units.

MAC 5th Floor Renovation

- Complete Renovation of 5th Floor including replacement of existing Mechanical and Electrical Systems.

MAC 5th Floor Renovation HVAC

- 30+ year old Air Handlers Replaced.
- All existing duct removed and new installed with common supply from the three (3) new air handlers.
- Induction boxes removed and replaced with Dual Duct (supply & make-up air) VAV's with Reheat

MAC 5th Floor Renovation HVAC

- New Make-up & Energy Recovery Unit was added.
- Pneumatic Controls replaced with DDC.

MAC 5th Floor Renovation Lighting

- All existing lighting was replaced with various efficient lighting methods.
- A lighting control system was added to assure that lighting was used only as needed. Lighting system is controlled by tenant

MAC Projects Results

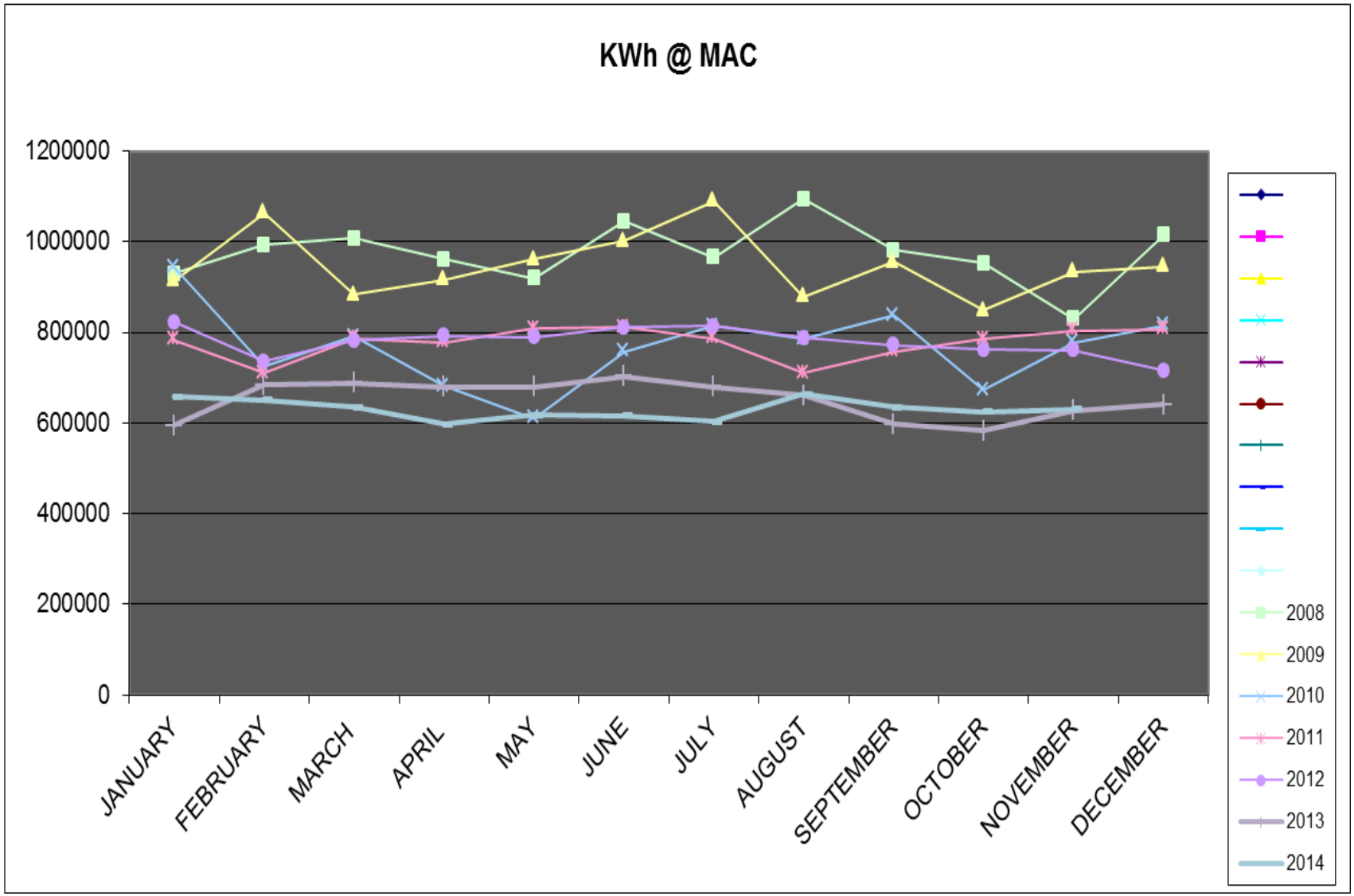
MAC Air Handler Upgrades

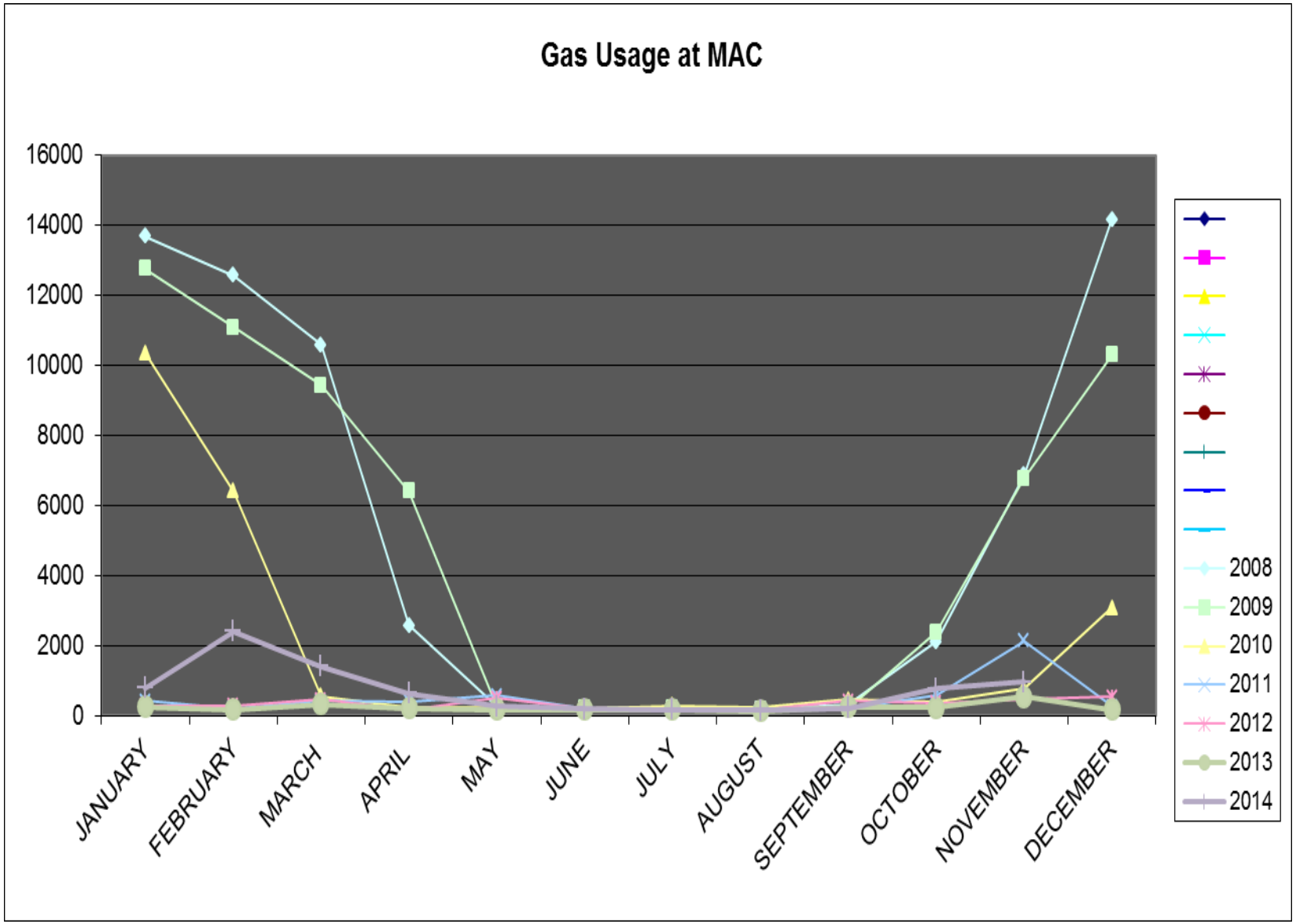
- The Air Handlers were original to the building. Unlike the project on 5th Floor, removal of the existing systems was not an option.
- Replaced inlet guide vanes on fans with VFD's
- Replaced Pneumatic Controls, Sensors & Valves with DDC.
- Set Schedules for AHU's
- UV lamps installed downstream of coils
- Substantially complete in February 2013

MAC Roof Replacement

The existing roof was removed down to the deck, new insulation board and Thermoplastic polyolefin (TPO) single-ply roofing membrane was installed.

The project was completed in April 2014.


KWh @ MAC
1200000
1000000
800000
600000
400000
200000
0
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
2008
2009
2010
2011
2012
2013
2014


Gas Usage at MAC
16000
14000
12000
10000
8000
6000
4000
2000
0
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
2008
2009
2010
2011
2012
2013
2014

MAC Year over Year

Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
43	6/30/2008	290401	763142.7	153.1	153.1	44471725	44471725	0.00%
38	6/30/2009	290401	912831.8	153.1	159.5	44471725	46307419	4.13%
55	6/30/2010	290401	735192.2	153.1	134.1	44471725	38941013	12.44%
61	6/30/2011	290401	519723	153.1	111.9	44471725	32496550	26.93%
58	6/30/2012	290401	587074.8	153.1	112.4	44471725	32639237	26.61%
74	6/30/2013	290401	548748.4	153.1	102.6	44471725	29802311	32.99%
72	6/30/2014	290401	474045.8	153.1	92	44471725	26719326	39.92%

900 W. Capitol Building

900 W. Capitol Building

- The 900 Building has 4 floors plus a basement.
- In 2008 the building underwent re-development which included all new HVAC (Water Source Heat Pumps), Dedicated Outside Air Unit (DOAU), lighting systems and an additional ½ floor was added to the 4th level.
- In 2010 ABA optioned to purchase the property.
- In 2011 the building was certified as a LEED Gold Building

900 W. Capitol Building
LEED GOLD

900 W. Capitol Building

- Initial Measurement & Verification Indicated that the building was not performing as intended
- In 2011 a consultant was hired to review the current M&V process and make recommendations to reduce energy consumption and cost.

900 W. Capitol Building

The consultant initially made twenty-five recommendations: two of which were with regard to the electrical rate for the building, six for metering and sixteen equipment related.

900 W. Capitol Building

Entergy's rate was changed from AR_SG1 to AR_LG1 and converted to the Entergy Commercial Space Heating Rider (CSHR)

900 W. Capitol Building

- Water loop pump operations were modified.
- Occupancy schedules put in place
- Occupied and un-occupied set-points established
- Modified Sequence of Operations on Energy Recovery Ventilation Unit
- Cooling Tower Corrections

900 W. Capitol Building

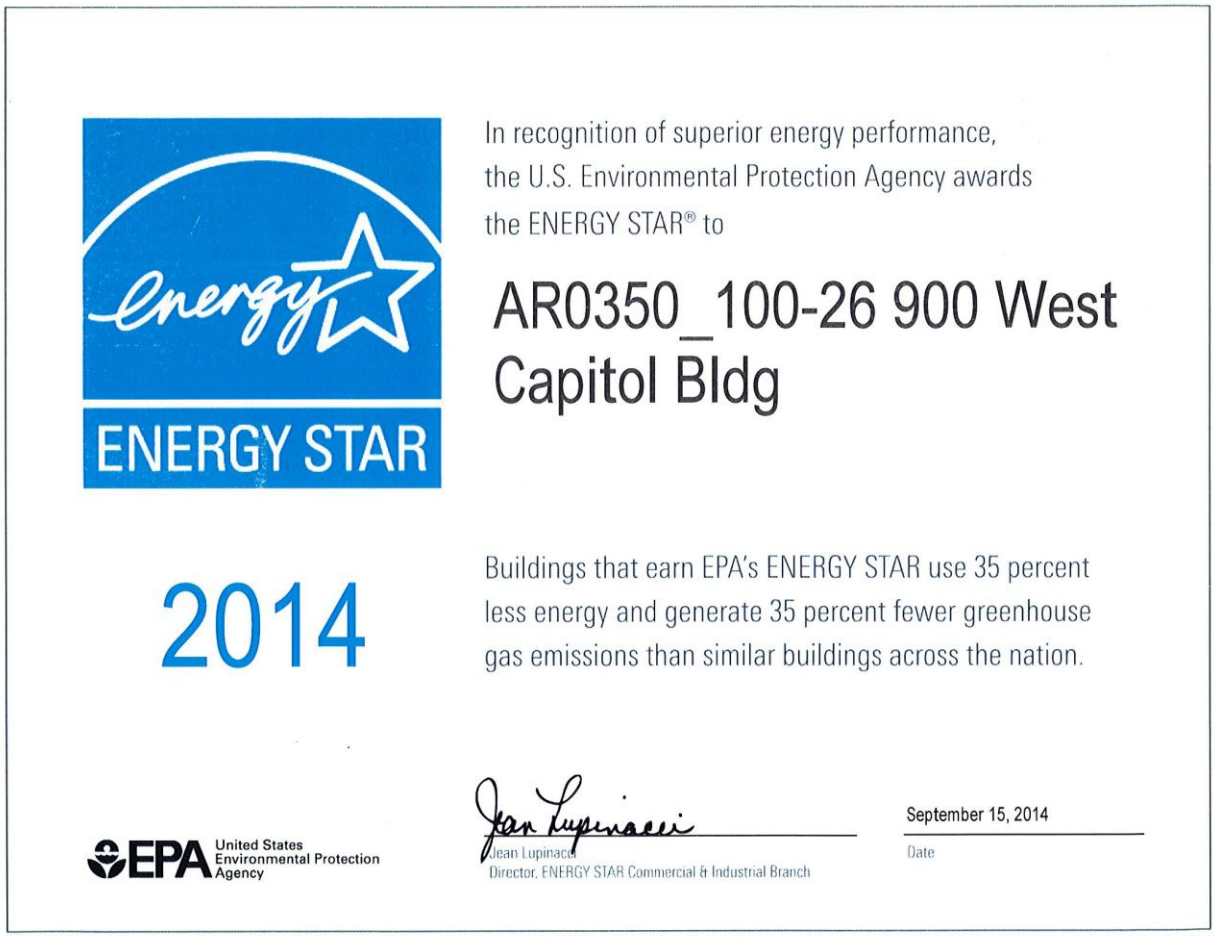
In September of 2012 an agreement between the State of Arkansas and Entergy was reached and the Solar Panels installed during the renovations were activated.

To date the Solar Panels have produced 91,777 KWh of power.

900 West Capitol Building Year over Year

Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
71	6/30/2011	129519	173433.8	57.9	57.9	7501205	7501205	0.00%
83	6/30/2012	129519	128360.7	57.9	46.5	7501205	6024143	19.69%
91	6/30/2013	129519	114143.3	57.9	39.8	7501205	5153804	31.29%
91	6/30/2014	129519	113074.5	57.9	39.4	7501205	5107208	31.91%

900 W. Capitol



ENERGY STAR

In recognition of superior energy performance, the U.S. Environmental Protection Agency awards the ENERGY STAR® to

AR0350_100-26 900 West Capitol Bldg

2014

Buildings that earn EPA's ENERGY STAR use 35 percent less energy and generate 35 percent fewer greenhouse gas emissions than similar buildings across the nation.

EPA United States Environmental Protection Agency

Jean Lupinacci
Director, ENERGY STAR Commercial & Industrial Branch

September 15, 2014
Date

Main Street Mall

Main Street Mall Existing Conditions

- Longstanding Humidity, Odor, Comfort, and Control Issues
- Negatively pressurized building.
- Poor Chiller performance.
- No Building Automation System
- Constant volume chilled water system.
- DX 100% OAU.
- Two VAV penthouse AHU units
- Most of the reheat was provided by electric coils.

Main Street Mall Challenges

- Non Functioning equipment
- Existing equipment inadequately sized, or had been re-purposed.
- Insufficient building history and records. Had to locate and inspect almost all equipment during initial surveys.
- No pressure and temperature ports on the existing coils to determine coil performance in problem areas.

Main Street Mall Controls

- Added new controls to all equipment including but not limited to exhaust fans, fan coil unit, supply terminals, AHU's, ERU and Chilled water system.
- Removed the existing Pneumatic system which did away with costly air leaks.
- Retrofitted the Atrium Smoke Evacuation System with DDC actuators and relays.

Main Street Mall Hydronic System Modifications

- Converted the constant volume air cooled chilled water system to variable volume including the addition of VFD's.
- Repaired the system make up water pressure regulator.
- Added an automatic air vent to the air separator.
- Added remote automatic air vents.
- Repaired Leaks at Chiller connections.

Main Street Mall
Supply Terminals

- Replaced plunger style terminal dampers with conventional control dampers, as a result, had to add new airflow probes to measure airflow since old dampers had airflow ring built into the damper.
- Implemented occupied and unoccupied airflow and temperature set-points.

Main Street Mall
Lighting Control

- Added Auto Off lighting control to most of the spaces.
- Some Tenant Frustrations encountered during setup.
- Not applicable to all locations.

Main Street Mall Results

- Non-functioning equipment repaired/replaced.
- Utilized the new BAS to assess problem areas.
- Increased plant efficiency.
- Utility consumption decreased.
- Improved Comfort

Main Street Mall
Year over Year

Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
41	6/30/2008	178168	323312.4	100.7	100.7	17943156	17943156	0.00%
43	6/30/2009	178168	366883.3	100.7	98.2	17943156	17496162	2.49%
46	6/30/2010	178168	341512.7	100.7	94.2	17943156	16784501	6.46%
46	6/30/2011	178168	296654.1	100.7	96.5	17943156	17192052	4.19%
49	6/30/2012	178168	311303.3	100.7	90.2	17943156	16065563	10.46%
50	6/30/2013	178168	317496.2	100.7	94	17943156	16741921	6.69%
74	6/30/2014	177510	256066.9	100.7	62.8	17943156	11139358	37.92%

Public Service Commission Building

Public Service Commission Building

The Public Service Commission Building was originally constructed as a warehouse in 1940 and was renovated in 1982 to serve as home to the Public Service Commission.

Public Service Commission Building

ABA Initiatives since 2011

- Performed corrective work on pneumatics
- Lighting retrofit
- Operational changes

Public Service Commission Building Issues

- Longstanding Comfort, and Control Issues
- Negatively pressurized building.
- Inefficient performance on chilled and hot water systems.
- No Building Automation System
- Multi-zone units in poor condition

Public Service Commission Building Challenges

- Relocation of tenant's staff
- Storing Furniture and equipment
- Renovating an occupied building
- Equipment removal and installation
- Renovation of HVAC systems only
- Minimal disruption of systems

Public Service Commission Building

- Removed all AHU's, ductwork and terminal devices and replaced with new AHU's, ductwork and VAV's w/reheat
- Added ERV's
- Removed pneumatic controls and replaced with DDC

Public Service Commission Building Year over Year

Facility Name	Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
PSC Building	22	6/30/2008	51685	$136,732	164.3	164.3	8493432	8493432	0
	12	6/30/2009	51685	$170,539	164.3	186.7	8493432	9648794	13.60%
	26	6/30/2010	51685	$133,894	164.3	151.5	8493432	7830947	7.80%
	35	6/30/2011	51685	$106,766	164.3	134.1	8493432	6931211	18.39%
	31	6/30/2012	51685	$111,225	164.3	129.1	8493432	6671616	21.45%
	49	6/30/2013	51685	$103,335	164.3	115.6	8493432	5976429	29.63%
	56	6/30/2014	51685	$98,896	164.3	111.2	8493432	5746474	32.34%

Justice Building

Justice Building

The East Wing of the Justice Building was built in 1957. In 1974 the Rotunda was added. The West Wing was added in 2000 and the East Wing was totally renovated in 2002.

Justice Building

- In April 2011 functionality testing was performed on the East Wing.
- Many issues were resolved while testing was performed.
- Issues found during the functionality test were repaired, programming was modified and scheduling programmed.

Justice Building
ABA Initiatives

- In December of 2011 functionality testing was performed on the controls system in the West Wing.
- In April of 2012 deficiencies found during testing were repaired.

Justice Building

- In June of 2013, building staff changed out 22 parking lot lights that were previously equipped with 250 watt Metal Halide lamps and replaced them with LED fixtures that use 110 watts.
- Staff have begun replacing lamps and ballast with high lumen T8 lamps and low ballast factor ballast.

Justice Building
Year over year

Facility Name	Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
Justice Building	48	6/30/2008	124071	$209,968	87.3	87.3	10829893	10829893	0
	43	6/30/2009	124071	$244,725	87.3	89.9	10829893	11150792	2.96%
	45	6/30/2010	124071	$237,672	87.3	90.9	10829893	11272656	4.09%
	42	6/30/2011	124071	$211,117	87.3	93.2	10829893	11565860	6.80%
	71	6/30/2012	124071	$183,095	87.3	67.6	10829893	8386599	22.56%
	80	6/30/2013	132687	$177,567	87.3	61.1	10829893	7585405	29.96%
	77	6/30/2014	132687	$172,410	87.3	58.5	10829893	7763182	28.32%

1515 Building

1515 Building

The 1515 Building was originally constructed in 1950. The building underwent significant Mechanical & Electrical renovations in 2003

1515 Building

- In October 2011 unoccupied scheduling was incorporated.
- In 2012 original ERV set-points were re-established, new windows were installed, non-condensing boilers were replaced with condensing boilers and roller shades were installed.

1515 Building Year over Year

Facility Name	Rating	Period Ending Date	Total Floor Space (Sq. Ft.)	Annual Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)	% of Change
1515 Building	41	6/30/2008	57708	$106,534	109.5	109.5	6316581	6316581	0
	43	6/30/2009	57708	$115,674	109.5	101.3	6316581	5844355	7.48%
	51	6/30/2010	57708	$98,508	109.5	93.3	6316581	5386399	14.73%
	39	6/30/2011	57708	$89,259	109.5	120.7	6316581	6963294	10.24%
	66	6/30/2012	57708	$82,742	109.5	75	6316581	4329301	31.46%
	81	6/30/2013	57708	$72,035	109.5	63.1	6316581	3643842	42.31%
	75	6/30/2014	57708	$74,589	109.5	67.7	6316581	3906996	38.15%

Benchmark 2008 EUI

Reporting Year: 2008 <----Select date here to generate report

Act 1494 Compliance Report
Arkansas Building Authority
Energy Use Intensity for Fiscal Year 2008

Met 2014 goal (-20%), after 2014 (-30%)
Made some energy reductions compared to baseline
Increased energy usage compared to baseline

Agency	Number of Buildings	Total Floor Space (Sq. Ft.)	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Percent Change from Baseline, %	Baseline Weather Normalized Site EUI (kBtu/Sq. Ft.)	Current Weather Normalized Site EUI (kBtu/Sq. Ft.)	Weather Normalized Percent Change from Baseline, %	Annual Energy Cost (US Dollars ($))
Arkansas Building Authority	12	1,150,048	139.6	139.6	0.00%	141.5	141.5	0.00%	$2,702,567

Notes by Agency: In the data call each agency will need to explain their rating

HOW DID WE DO?

Reporting Year: 2012 <----Select date here to generate report

Act 1494 Compliance Report
Arkansas Building Authority
Energy Use Intensity for Fiscal Year 2012

Met 2014 goal (-20%), after 2014 (-30%)
Made some energy reductions compared to baseline
Increased energy usage compared to baseline

Agency	Number of Buildings	Total Floor Space (Sq. Ft.)	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Percent Change from Baseline, %	Baseline Weather Normalized Site EUI (kBtu/Sq. Ft.)	Current Weather Normalized Site EUI (kBtu/Sq. Ft.)	Weather Normalized Percent Change from Baseline, %	Annual Energy Cost (US Dollars ($))
Arkansas Building Authority	13	1,279,567	139.6	106.8	-23.48%	141.5	106.7	-24.61%	$2,387,196

Act 1494 Compliance Report

Arkansas Building Authority

Energy Use Intensity for Fiscal Year 2014

Met 2014 goal (-20%), after 2014 (-30%)
Made some energy reductions compared to baseline
Increased energy usage compared to baseline

Agency	Number of Buildings	Total Floor Space (Sq. Ft.)	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Percent Change from Baseline, %	Baseline Weather Normalized Site EUI (kBtu/Sq. Ft.)	Current Weather Normalized Site EUI (kBtu/Sq. Ft.)	Weather Normalized Percent Change from Baseline, %	Annual Energy Cost (US Dollars ($))
Arkansas Building Authority	13	1,287,525	139.6	95.7	-31.41%	141.5	95.0	-32.85%	$2,096,132

Year Over Year EUI

Year-Over-Year Agency Level Comparison - Total Energy

Met 2014 goal (-20%), after 2014 (-30%)
Made some energy reductions compared to baseline
Increased energy usage compared to baseline

Year	Number of Buildings	Total Floor Space (Sq. Ft.)	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Percent Change from Baseline, %	Baseline Weather Normalized Site EUI (kBtu/Sq. Ft.)	Current Weather Normalized Site EUI (kBtu/Sq. Ft.)	Weather Normalized Percent Change from Baseline, %	Annual Energy Cost (US Dollars ($))
2008	12	1,150,048	139.6	139.6	0.00%	141.5	141.5	0.00%	**$2,702,567**
2009	12	1,150,048	139.6	137.9	-1.20%	141.5	139.6	-1.36%	**$3,061,049**
2010	12	1,150,048	139.6	129.1	-7.52%	141.5	127.2	-10.15%	**$2,658,118**
2011	13	1,279,567	139.6	124.3	-10.91%	141.5	124.1	-12.32%	**$2,357,004**
2012	13	1,279,567	139.6	106.8	-23.48%	141.5	106.7	-24.61%	**$2,387,196**
2013	13	1,288,583	139.6	101.1	-27.55%	141.5	101.3	-28.40%	**$2,261,223**
2014	13	1,287,525	139.6	95.7	-31.41%	141.5	95.0	-32.85%	**$2,096,132**

Facility Name	Energy Star Baseline Rating	FY14 Energy Star Rating	Baseline Energy Cost (US Dollars ($))	FY14 Energy Cost (US Dollars ($))	Baseline Site Energy Intensity (kBtu/Sq. Ft.)	Current Site Energy Intensity (kBtu/Sq. Ft.)	Baseline Total Site Energy Use (kBtu)	Current Total Site Energy Use (kBtu)
Justice Building	48	77	209968.08	172410.24	87.3	58.5	10829892.5	7763182.3
DFA Admin Building	66	62	76068.96	76916.31	70.4	78.7	3661997.2	4099005
1515 Building	41	75	106533.5	74588.5	109.5	67.7	6316580.6	3906996.1
One Capitol Mall Building	43	72	763142.67	474045.78	153.1	92	44471724.8	26719326.4
Natural Resources Building	N/A	N/A	477273.73	325804.26	440.6	355.6	32557291.5	26273602.1
Public Service Commission	22	56	136732.18	98896.43	164.3	111.2	8493431.9	5746473.9
State Crime Lab Building	N/A	N/A	279449.28	215121.13	187.9	174.1	17141554.4	15753583.3
Office Building (Fort Smith)	49	62	88548.76	88822.02	78.9	74	5288214.1	4960412.6
Main St Mall	41	74	323312.36	256066.88	100.7	62.8	17943155.9	11139358.2
Office - 410 Battery	N/A	N/A	3230.77	2821.6	65.3	52.5	139001.8	111825.8
Shop	N/A	N/A	24269.29	21412.39	94.2	91.3	1334409.5	1293409.1
501 Building	82	85	214037.46	176151.7	83.6	70.4	12330918	10384259.8
900 West Capitol Bldg	71	91	49081.38	113074.47	57.3	39.4	7501205	5107207.6
			$2,751,648.42	**$2,096,131.71**	**139.6**	**95.7**	**168009377**	**123258642.2**

Lessons Learned

- You cannot manage what you cannot see
- Teamwork is essential from the top down
- Sustaining is a never ending job
- Operator training is essential
- Controls tailored to the end user are essential

Questions?