

STUDY SUMMARIES: (Item #1) The following “study presentations” have been added to this year’s report. A short summary of each is required for our report. The following summaries must be edited and approved for the final report.

May 23, 2013--LEGISLATIVE REVIEW, Representative Warwick Sabin and Representative John Hutchinson

Representative Warwick Sabin gave an overview of legislation introduced and/or passed during the 89th General Assembly affecting alternative energy generation, noting he and Representative Hutchinson were the main sponsors of HB1390 “To Create the Arkansas Distributed Generation Act.” He stated this was just a stepping stone in trying to promote more alternative energy generation in Arkansas by only mandating up to 5% in terms of purchasing energy generated by renewable energy facilities in Arkansas. It did not set a timetable as far as when that 5% would have to be achieved. There was intense opposition from the major utilities; and the bill was referred to the Joint Interim Committee on Energy for interim study. He stated that they plan to introduce this again in the 90th General Assembly.

Representative Sabin noted Energy Legislation Enacted:

SB340 (Act 554) - TO AMEND THE GUARANTEED ENERGY COST SAVINGS ACT AND TO ALLOW STATE AGENCIES TO USE MAINTENANCE AND OPERATIONS APPROPRIATIONS FOR DEBT SERVICE RELATED TO A GUARANTEED ENERGY COST SAVINGS CONTRACT.

SB640 (Act 1074) - TO AUTHORIZE THE ESTABLISHMENT OF ENERGY IMPROVEMENT DISTRICTS TO FUND LOANS FOR ENERGY EFFICIENCY IMPROVEMENTS, RENEWABLE ENERGY PROJECTS, AND WATER CONSERVATION IMPROVEMENTS.

SB792 (Act 532) - TO CREATE THE ARKANSAS CLEAN-BURNING MOTOR FUEL DEVELOPMENT ACT; AND TO CREATE THE CLEAN-BURNING MOTOR FUEL DEVELOPMENT FUND.

...and Additional Legislation which was introduced:

SB933 - TO AMEND THE ARKANSAS ALTERNATIVE FUELS DEVELOPMENT ACT; AND TO PROVIDE A TAX CREDIT FOR THE PRODUCTION OF ALTERNATIVE FUELS.

HB1769 - TO CREATE AN INCOME TAX CREDIT FOR SOLAR ENERGY SYSTEMS.

Representative Sabin stated he believes the legislation is moving Arkansas in the right direction.

Representative Hutchinson stated he is a farmer from northeast Arkansas and strongly believes in renewable energy and will continue to support alternative energy legislation.

May 23, 2013 HYDROPOWER

Arkansas Waterways

“The most efficient, economical, and environmentally friendly commercial transportation option”

Mr. Gene Higginbotham, Executive Director, Arkansas Waterways Commission, (see appendices R)

Noted the AWC is the sole state agency responsible for developing, promoting and protecting waterborne transportation in Arkansas. It promotes economic development for ports on the state's five commercially navigable rivers: Arkansas, Mississippi, Ouachita, Red, and White. Mr. Higginbotham stated he has a personal interest in alternative energy. He is currently working on a professional certificate in "Energy Efficiency and Emerging Technologies" from Stanford University. Mr. Higginbotham's PowerPoint presentation, (Attachment 1) highlighted the following: [a copy of this handout is available at waterways.arkansas.gov.]

- Waterways are the most efficient, economical and environmentally friendly form of transportation.
- Arkansas has the 3rd largest inland waterway system in the country, but is 33rd in what is shipped using that waterway system. The gap should be reduced.
- Waterborne transportation requires significantly less fuel than rail or trucks. The cost per ton mile for a barge is only \$.97, compared to \$2.53 for rail, and \$5.35 for trucking. The number of ton-miles per gallon of fuel (one gallon of fuel moving one ton of cargo) by barge is 576 miles; by train, 413 miles; and by truck, 155 miles.
- Arkansas currently ships a lot of agricultural products on Arkansas' waterways. Barge transportation actually makes the other rates drop making products more affordable for consumers and putting more money back into farmers' pockets.
- The Environmental Protection Agency (EPA), Emission Control Laboratory determined that tow boats emit drastically lower amounts of hydrocarbon, carbon monoxide, and nitrous oxide.
- Arkansas is one of the few systems that actually has hydropower capacity on its navigation system.

Mr. Higginbotham stated the AAEC could assist the Waterways Commission by talking to their congressional Representatives and Senators and having them help the Corps of Engineers obtain more funding necessary to upgrade their 50-year-old system.

Arkansas Hydropower Briefing

Mr. Lee Beverly, Project Manager, U.S. Army Corps of Engineers (USACE) (see appendices S)

Presented a PowerPoint, (Attachment 2) which included the following information:

- Two things required for hydropower installation are water flow and elevation.
- Typical hydropower turbine designs are:
Pelton, Francis and Kaplan, with Kaplan the most used in Arkansas.
- No Pelton units are used in Arkansas. They are usually found in locations such as Hoover Dam, Glen Canyon Dams and other very large high pressure and elevation dams.
- Kaplan Units are most useful in lower head or elevation plants. Most of the hydropower development in the state in recent years has been on low head installations such as the Dardanelle plant. All the plants operated by Arkansas Electric Cooperative Corporation (AECC) are horizontal shaft Kaplan units. The three plants that were recently completed on the lower White River are horizontal shaft Kaplan units.
- Hydrokinetic units are being developed, but none in Arkansas.
- Energy produced in most of the plants is "peaking capacity" or "base energy". The hydro plant's economic value is typically in peaking capacity. The USACE plants are

mainly run only during the highest demand period of the year and during occupied hours for businesses and facilities. Base energy production is suited toward the big coal and gas plants, and combined cycle plants operated in the state.

□ The two types of operation are Stored water and Run-of-River (they run when there is water, and they don't when there is not). Stored water operation is at the large impoundments such as Greers Ferry, Norfolk, Bull Shoals, Greeson, DeGray, and Ouachita. Entergy also runs their dam on Lake Hamilton as a stored water operation. Run-of-River plants are the AECC plants on the Arkansas River, the Dardanelle and Ozark plants operated by the USACE, and the three small plants Independence County runs on the lower White River.

Hydropower plants currently operating in Arkansas are listed by capacity: Bull Shoals, Dardanelle, Beaver, Dam 2, Ozark, Greers Ferry, Norfolk, Blakely Mountain, DeGray, Carpenter Dam, Murray, Ellis, Whillock, Narrows, Rammel Dam, Marcella, Batesville, Earnhardt and Lee Creek. Arkansas hydropower capacity is approximately 1400 mega watts (mw), which is a very significant energy contribution to Arkansas' energy production. Arkansas

Nuclear One is approximately 1000 mw, so hydropower is about 1.4 times the output of one of the state's largest plants. A lot of this energy also goes out of state.

□ The federal system was established by Congress in 1944. The USACE is required by law to market to only "preference customers", either a municipal body or a non-profit entity. One of the federal system's guiding criteria is that no one should make a profit on the power either produced or sold. The Corps of Engineers produces the power and Southwestern Power Administration is responsible for its marketing and distribution. Arkansas customers are the cities of Bentonville, Clarksville, Jonesboro, AECC, Paragould, Paris and Piggott. Southwestern

Power also has customers outside of Arkansas.

□ Tennessee Valley Authority (TVA) is not part of the southwestern power system. The country is divided into various administrations: Bonneville Power Administration (BPA) in the northwest; Western Area Power Administration (WAPA) in the western states; Southwestern Power Administration (SWPA), and Southeastern Power Administration (SEPA) in the southeast.

Mr. Beverly stated the USACE has a valuable role in Arkansas and is looking forward to some large and interesting projects in the near future which will add to local economies.

Free Flow Power Market-Leading US Hydropower Developer

Mr. Mark Lassman, Director of Energy Trading, Free Flow Power Corporation (see appendices T)

Presented a PowerPoint (Attachment 3), and noted Free Flow Power (FFP) is a clean renewable energy company focusing on hydropower, hydrokinetic and hydro pumped storage as reliable,

cost-effective sources of electricity and grid stability. Mr. Lassman noted one of the biggest misconceptions is that there is limited opportunity in hydropower simply because the sites are all taken. He stated that this is just a myth and there is tremendous opportunity.

Hydro output is estimated to double by the year 2030. The majority of the dams in the United States have no hydro generation (77,000 out of 79,000 existing dams provide a

retrofit opportunity). Some advantages of hydropower are tax benefits, greater focus on regulatory, recognition of hydro as a renewable energy, and a better market currently for hydropower. He indicated he is starting to see some of the hydro plants go for higher values. The largest pump storage facility in the world, Bath County located in Virginia, produces over 3000 mw.

Mr. Lassman stated even though Arkansas does not fall under the current Renewable Portfolio Standard (RPS) initiative, the development of hydropower makes sense. The biggest obstacle facing most of these renewable energies is the intermittent nature of the product. This is why hydrokinetics is a real advantage. Ms. Potts stated when Independence County began its efforts to develop the three small hydro plants, the Federal Energy Regulatory Commission (FERC) was the main obstacle. It took approximately six years to obtain a license and approximately 15 years to find a purchaser for the power. To have someone like Mr. Lassman working on their behalf would have been very helpful. Mr. Lassman stated that Arkansas will soon be going into a pool type system similar to the northeast which is called PJM (Pennsylvania, Jersey and Maryland). This system will be customer friendly and easier to manage generation. This is called “spot market backed” meaning no need to find a buyer for your power; it is submitted into the pool. Representative Hutchison suggested that irrigation wells be used to generate electricity since 85% of the wells are located near 3-phase power. He stated he is willing to do what is necessary to help Arkansas move forward. Ms. Audrey House stated she would like to see Arkansas be number one in Renewable, Efficiency, Profitability and Sustainability (REPS) by 2036.

August 9, 2013 Hydropower Regulatory Efficiency Act of 2013 was signed into law by President Obama. The act promotes small hydroelectric and conduit hydropower projects, authorizes the FERC to extend preliminary permit periods, and promotes hydropower development at nonpowered dams and closed-loop pumped storage projects. Under the Federal Power Act (FPA), FERC regulates the nation’s non-federal hydropower resources.

September 19, 2013 STATUS ON ENHANCED ENERGY CODE [HANDOUTS 1 and 2]

Mr. JD Lowery, Policy and Sustainable Energy Manager, Arkansas Energy Office (AEO), Arkansas Economic Development Commission (see appendices U)

Gave a brief update on the “2013 Arkansas Energy Code” and “2013 Arkansas Energy Code – A market-based consumer driven approach.” Mr. Lowery stated the AEO is in the process of updating rules for the new residential construction energy standard from the International Energy Conservation Code (IECC) 2003 to IECC 2009. This process was done on the commercial side in 2011. The AEO gathered input for six months with a stakeholder group of 17 individuals representing the state home builders association , realtors, lenders, appraisers, municipal and publicly owned utilities, as well as code officials throughout the state. The AEO also opened a public comment period September 4, 2013, and ending on October 4, 2013. Once this public comment period ends, it will come before the Joint Energy Committee for its review, late October or early November. The state sets the standard for the energy code and relies on the municipalities to enforce it. He said the Home Builders Association is

currently against this.

Mr. Lowery stated the AEO is also proposing to add an Energy Cost Disclosure Label for new home construction, similar to what is found on vehicles and large appliances. He said it would provide for:

1. Consumer Involvement - allowing consumers to understand the long-term operating cost of new homes.
2. Builder Involvement - protecting investment in energy efficiency features and providing flexibility to builders.
3. Municipality Involvement - reducing burden on municipal code officials and local budgets.
4. Utilizing a Home Energy Rating Index (HERS) score.

Mr. Lowery stated the weatherization assistance program has been moved to the AEO from the Arkansas Department of Human Services, and the AEO believes this is ultimately better for state policy.

PROGRESS ON STRATEGIC ENERGY PLAN

Mr. JD Lowery also listed recommendations and progress to-date on the energy plan:

1. Update the IECC 2003 to IECC 2009

--This has been completed on the commercial side and in progress for residential construction.

2. Increase inspectors for natural gas production wells throughout the state.

--Act 121 addressed this issue.

AN ACT TO MAKE AN APPROPRIATION FOR PERSONAL SERVICES AND OPERATING EXPENSES FOR THE OIL AND GAS COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 2014; AND FOR OTHER PURPOSES.

3. Recommendation to have a one-time tax incentive for compressed natural gas (CNG) stations and car conversions or incremental cost of purchasing a new CNG vehicle.

--Act 152 addressed this issue.

AN ACT TO PROVIDE INCENTIVES FOR CONVERTING DIESEL-POWERED MOTOR VEHICLES AND GASOLINE-POWERED MOTOR VEHICLES TO MOTOR VEHICLES POWERED BY COMPRESSED NATURAL GAS OR PROPANE GAS; TO DECLARE AN EMERGENCY; AND FOR OTHER PURPOSES.

4. The Guaranteed Energy Cost Savings Act moved the procurement process from the state procurement office to the AEO for energy performance contracting with energy service companies.

--Act 554 addressed this issue.

AN ACT TO AMEND THE GUARANTEED ENERGY COST SAVINGS ACT; TO ALLOW STATE AGENCIES TO USE MAINTENANCE AND OPERATIONS APPROPRIATIONS FOR DEBT SERVICE RELATED TO A GUARANTEED ENERGY COST SAVINGS CONTRACT; AND FOR OTHER PURPOSES.

5. Act 1418 - AN ACT TO CREATE AN INCOME TAX EXEMPTION FOR QUALIFIED DROP-IN BIOFUELS MANUFACTURERS; AND FOR OTHER PURPOSES.

Mr. Lolley requested Mr. Lowery to provide a written summary of the following concerning the energy plan:

--Progress at the end of 2013

- Update from the 2013 legislative session
- Current status or what has been accomplished to-date
- Future Goals

November 21, 2013 ARKANSAS ADVANCED ENERGY ASSOCIATION
“OVERVIEW OF ISSUES AND INITIATIVES”

Mr. Steve Patterson, Executive Director, Arkansas Advanced Energy Association (AAEA),

(see appendices V)

[PowerPoint Presentation] was recognized and noted advanced energy can be defined as any service or technology that makes America’s energy supply more secure, clean and affordable. This can include, but not limited to, bio-fuels and bio-products, compressed natural gas and other clean burning fuels, energy-efficient buildings, energy-saving consumer products, geothermal hydropower, nuclear, solar and wind. AAEA focused on these areas and tried to identify companies working in these areas in Arkansas.

AAEA membership is a unique blend of 90+ manufacturers, energy providers, entrepreneurs, small business owners, educators, researchers and public institutions. He stated AAEA endorsed the following legislation enacted during the 2013 Session:

- Property Assessed Clean Energy Act 1074
- Guaranteed Energy Cost Savings Act 554
- Clean Burning Motor Fuels Development Act 532
- Revisions to Net Metering Rules Act 1221
- Energy Efficiency Bonds Authorization for State Agencies Act 1252

The AAEA has been conducting Property Assessed Clean Energy (PACE) seminars around the state since August. The PACE act is a local option law and the burden is on the communities to create a local ordinance and PACE district.

Fayetteville is the first to pass an ordinance creating the PACE district in October 2013.

Mr. Patterson listed AAEA activities:

- Presentation of General Assembly Candidate Workshops during Summer 2012 in partnership with the University of Arkansas Applied Sustainability Center
- Convening advanced energy working groups of industry leaders on energy efficiency, bio-fuels and renewable energy
- Advanced Energy Public Opinion Survey, 2012 and 2013
- Access to Capital Report, released October 2013
- Farm-to-Fuel Community Innovation Project in the Arkansas Delta in partnership with alt. Consulting
- Supports sister organization AAEA with research and public education on advanced energy-related issues before the Arkansas Public Service Commission.

Mr. Patterson stated the Arkansas Delta’s Farm-to-Fuel community innovation project in partnership with alt. Consulting was launched in Dewitt on October 29, 2013. The experimental energy crop, camelina, is a lowmaintenance crop that does not take away from the yields of soybean or cotton and offers farmers an opportunity to make approximately \$130-\$140/acre of camelina grown. The two main marketing opportunities

for this crop are as a high nutrition source for livestock feed and camelina oil, which can be easily converted to bio-diesel fuel. He stated the mobile bio-refinery unit can produce up to one million gallons/year of bio-diesel fuel.

March 20, 2014 ARKANSAS CHAPTER OF INTERFAITH POWER AND LIGHT – MISSION PROJECTS (see appendices W)

Reverend Steve Copley, Board Chairman, Arkansas Interfaith Power and Light (IPL)

Arkansas Interfaith Power and Light (AIPL) works with faith communities to address the causes and consequences of global climate change through education and public policy advocacy. AIPL's goals are:

- To explore the scientific, spiritual, and social dimensions of ecological issues;
- To nurture reverence and wonder toward the creation and our interconnected earth community;
- To apply these understandings and reflections in the conduct of our lives as individual, families, and congregations;
- To advocate public policy that supports the health of the earth's ecosystems.

AIPL presented to the AAEC on the work being done at the community level; with primary focuses on conservation & energy management at the personal level.

March 20, 2014 HYDROELECTRIC ACTIVITY/POTENTIAL WITHIN THE UNITED STATES & ARKANSAS-“An Overview of Hydropower”

Mr. Jeff Leahey, Esq., Deputy Executive Director, National Hydropower Association

(see appendices X)

[PowerPoint Presentation #2] The NHA is a forum to unite industry with a common voice and is exclusively dedicated to advancing the interest of the hydropower industry at the federal level. NHA has over 180 members and anyone who has a business interest in the hydropower industry

can become a member. Hydro power is the nation's most available, reliable, affordable and sustainable energy source, requiring only the power of moving water – rivers, streams, and ocean waves and tides. Hydropower is domestic and renewable. Much of the money spent on hydropower stays in America, and expanding hydro capacity could create up to 1.4 million cumulative U.S. jobs.

Mr. Leahey stated:

- ***Hydropower is the largest source of renewable electricity in the U.S.,*** and made up 7% of overall electricity generation and the majority of renewable electricity in 2012. In Arkansas, hydro made up 3.4% of total generation and about 57% of renewable generation in 2012.
- Some key characteristics of the hydro fleet are that only 3% of the 80,000 U.S. dams generate electricity and hydropower is generated in every region and benefits every state, employing up to 300,000 workers around the U.S.
- Of total U.S. hydro generation – about half comes from the federal hydropower system

and the other half from private industry.

- With the right policies in place, the U.S. could add 60,000 mega watts (MW) of new hydro capacity by 2025, much of which can be created by maximizing existing

infrastructure or with low-impact projects.

- The FERC pipeline tops 64,831 MW across 399 projects.

Arkansas projects under consideration: Otto, Alamo, Big Pig, David D. Terry Lock & Dam, and River Mountain Advanced Pumped Storage.

- On August 9, 2013, President Obama signed the Hydropower Regulatory Efficiency Act and the Bureau of Reclamation Small Conduit Hydropower Development and Rural Jobs Act into law promoting regulatory improvements and hydropower project development.

June 19, 2014 CO-GENERATION INITIATIVES – ARKANSAS

OPPORTUNITIES

Mr. Tom Howard, Vice President for Governmental Affairs, Domtar Corporation, (see appendices Y)

The Arkansas Alternative Energy Commission (AAEC) elected to study systems employing combined heat and power (CHP) technology. CHP, also known as cogeneration, is the simultaneous production of process heat and electricity from a single or combination fuel source, ideally a renewable fuel source. CHP is a much more efficient process for generating heat and power than conventional electrical utility plants and manufacturing facilities that use boilers for only dedicated process steam production. Mr. Tom Howard, Domtar Corporation was invited to present, to the AAEC, information regarding CHP projects that Domtar has successfully completed at two (2) of their facilities. Mr. Howard presented details of the CHP process employed at their paper mills in Wisconsin and South Carolina. Both projects were hugely successful producing steam for their papermaking process and electricity for the mill and the utility grid. The projects were cost effective with good returns on the investment, improved environmental conditions, helped the states meet renewable energy goals, lowered fuel demand for unit output, created direct and support jobs for the community and ensured the sustainability of the existing paper mills.

June 19, 2014 Murray Lock and Dam Tour

Mr. Aaron K. McGee, Deputy Operations Manager of the Little Rock District Russellville Project Office, U.S. Army Corps of Engineers, (USACE) facilitated the

tour. Randy Crapps, Lockmaster, presented information about the McClellan-Kerr navigation system and specifically how Murray Lock and Dam operates. He mentioned that the McClellan-Kerr

navigation system goes from the mouth of the Mississippi River to Tulsa, Oklahoma. The locks will hold up to 9 barges at one time and are in operation 24 hours each day servicing an average of 200 barges a month. There were several questions on how the lock and dam operates and the potential for more hydropower sources.

September 18, 2014 Representative John Hutchison was recognized and invited commission members to attend the State Agencies and Governmental Affairs meeting November 10, 2014, in Room A of the Multi-Agency Complex, Little Rock, Arkansas. He stated he would be discussing Clean Line Energy's proposed transmission lines in Arkansas. Ms. Potts asked what the Arkansas Public Service Commission's position is concerning Clean Line's proposed transmission line. Mr. John Bethel, Director, Public Service Commission (PSC), stated the PSC is continuing to monitor actions on the Clean Line transmission line. There is nothing pending before the PSC regarding the line, all activities are in front of federal agencies, primarily the U.S. Department of Energy. He stated Clean Line asked for a certificate of convenience and necessity to be identified as a public utility in Arkansas, and the PSC found they did not meet the statutory requirements at that time. They have not made any other filing at the PSC. The PSC is continuing to monitor and determine whether there is any action that is required in the future. Representative Hutchison provided commission members an article titled, "Kansas Senate Votes to Repeal Renewable Mandates." [Handout 1]

Ms. House stated there was an HBO documentary concerning Kansas considering the repeal of the renewable energy mandates. The documentary was titled, "Years of Living Dangerously." She stated Kansas was fighting against the Heartland Institute. The documentary showed Mr. James M. Taylor from the Heartland Institute speaking in Little Rock, Arkansas, dismissing the need for this commission, and dismissing any kind of need for renewable portfolio standards. The Heartland Institute is stating global warming and climate change does not exist, and there is no need for renewable options.

Ms. House stated since recommendations in the 2012 report have not been addressed, they should be condensed to key elements and added to the 2014 report. Mr. Hauser asked for suggestions on possible 2015 discussion topics. Ms. House made the following suggestions:

- Instead of being called "Alternative" it should be more about an Energy Plan
- Job creation potential
- Transition from coal-based to renewable
- Additional co-generation aspects
- Public consumer and curriculum-based education program
- Presentation from the Heartland Institute

Mr. Allen requested staff review previous meetings and send commission members the information from the Arkansas Energy Office presented on the Energy Plan.

October 20, 2014 REVIEW STATUS OF STATE ENERGY PLAN

Mr. J.D. Lowery, Director of the Arkansas Energy Office, Arkansas Department of Economic Development (ADED) [Handout] (see appendices Z)

Information will be inserted once minutes are approved by AAEC on December 16, 2014