Document Metadata:DOE-HQ-2015-0015-DRAFT-0008

Document Details

Docket ID: DOE-HQ-2015-0015

Docket Title: Clean Line Plains and Eastern Transmission Line *

Document File:

Docket Phase: Notice of Application

Phase Sequence: 1

Title: Comment on FR Doc # 2015-09941

Number of Attachments: 6

Document Type: PUBLIC SUBMISSIONS *

Document Subtype: Public Comment

Comment on Document ID: DOE-HQ-2015-0015-0001

Comment on Document Title: Applications: Clean Line Plains and Eastern Transmission Line

Status: Pending_Post

Received Date: 06/09/2015 *

Date Posted:

Posting Restriction: No restrictions

Submission Type: API

Number of Submissions: 1 *

Document Optional Details

Status Set Date: 08/19/2015

Current Assignee: Bacon, Cuttie (DOE)

Status Set By: Adams, Andrea (DOE)

Comment Start Date:

Comment Due Date:

Legacy ID:

Tracking Number: 1jz-8jbt-xyd7

Submitter Info

Comment: See attached file(s) *

First Name: CYNTHIA *

Middle Name:	
Last Name:	CALLAHAN *
Mailing Address:	701 Hickeytown *
Mailing Address 2:	Road *
City:	London *
Country:	United States
State or Province:	Arkansas
ZIP/Postal Code:	72847 *
Email Address:	CYNTHIA.CALLAHAN.11@GMAIL.COM
Phone Number:	
Fax Number:	
Organization Name:	
Submitter's Representative:	
Government Agency Type:	
Government Agency:	
Cover Page:	

Attachment 1

Cynthia Callahan
Pope County
London, AR 72847
June 2, 2015

Dept of Energy Section 1222
Clean Line Energy Partners (CLEP)–Plains and Eastern Clean Line Application.

Dear Secretary Moniz,

In order to exercise the authority to engage in these activities under section 1222, the Secretary, in consultation with the applicable Power Marketing Administrator, must first determine that a proposed Project satisfies certain statutory criteria:

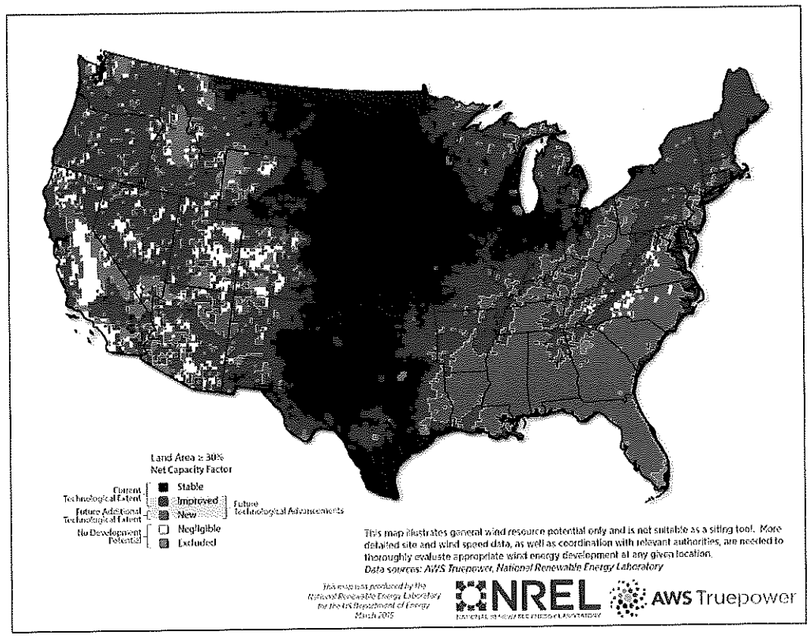
i. The proposed Project must be either:

(A) Located in an area designated under section 216(a) of the Federal Power Act (16 U.S.C. 824p(a)) and will reduce congestion of electric transmission in interstate commerce; ***NOPE***

(B) Necessary to accommodate an actual or projected increase in demand for electric transmission capacity;

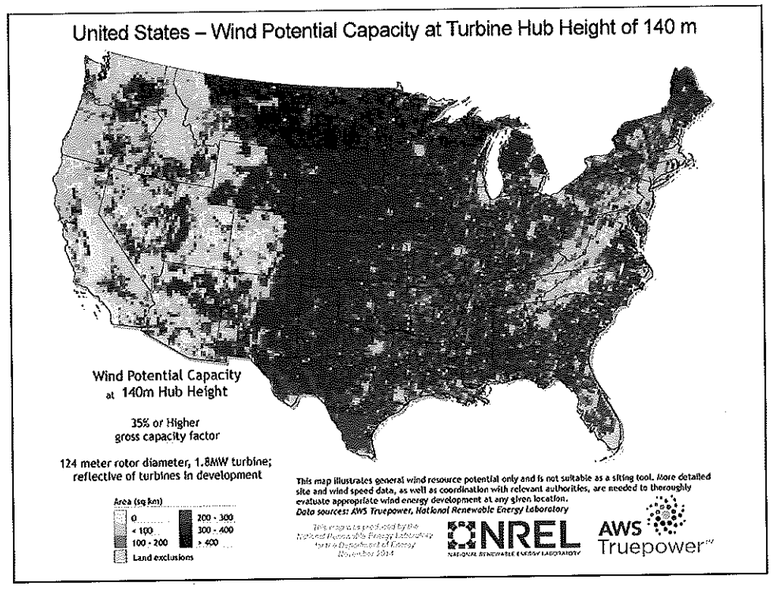
Sec. Moniz, I heard you tell the Congressmen at the Quadrennial Energy Review, via YouTube, that Energy Demand has 'FLATLINED'. This project is NOT NECESSARY.

Clean Line says the project is needed because the South Eastern U.S. doesn't have access to wind power but according to http://energy.gov/eere/articles/unlocking-our-nation-s-wind-potential That is NOT TRUE.



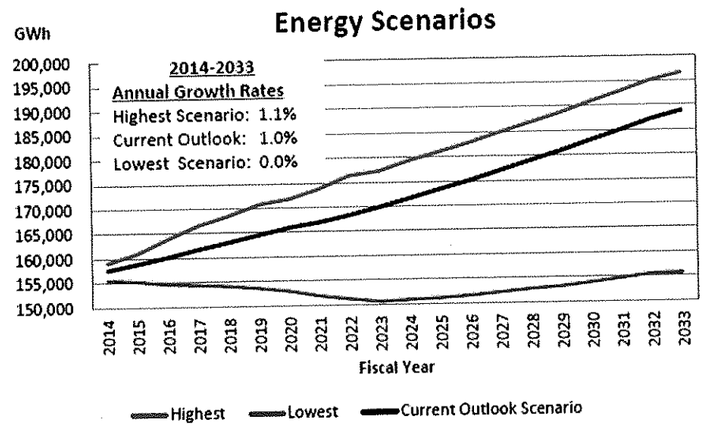
This map was in an Energy.gov article on MAY 19, 2015! Clean Line's data from 2009 is obsolete, undated and untrue.

Even this one from 2014 does not validate Clean Line's claim that the SE can't develop its own wind.



The Law says there it must be necessary to accommodate actual or projected need but according to the DRAFT TVA IRP 2015 the Current Outlook 1.0 % increase – low Scenario 0.0% - Reality is likely less than 1.0%. This demonstrates NO NEED for this project. TVA has evaluated the CLEP project and has not made it a priority; it appears in the riskiest scenario and won't be considered as a possibility until 2030. This project is NOT NECESSARY according to the TVA.

http://www.tva.gov/environment/reports/irp/pdf/TVA-Draft-Integrated-Resource-Plan.pdf



About wind;

We also have long-term power purchase contracts with eight wind farms located in Illinois, Kansas and Iowa. These facilities provide about 1,500 MW of nameplate capacity. TVA anticipates about 14% of the nameplate to be available for peak summer requirements. TVA obtains the renewable energy credits from seven of these farms. Renewable energy credits are a separate commodity formed from the production of energy at designated sites.

Renewables: Renewable additions range from ~900 MW to ~12,600 MW of nameplate capacity. The lowest selection of renewable assets occurs in the distributed marketplace scenario. The highest selection of renewables occurs in the economic growth scenario. This includes utility and commercial scale renewables and does not include small distributed renewable assets. The assumptions on distributed renewables were considered in the load demand projections for each scenario (see further discussion in Appendix C).

- There are no immediate needs for baseload resources beyond the completion of Watts Bar Unit 2 and the Browns Ferry extended power uprates.
- Most of the variation in expansion plans is around natural gas and renewables and most of the resource plans show a tradeoff between EE and gas resources.
- Higher levels of energy efficiency and renewable resources are indicated in many cases over the 20 year study period.
- Changing environmental standards for CO2 will drive retire/control decisions on some coal-fired generation in the mid-2020s
- Solar resources begin appearing in the resource plans in the mid 2020s; wind resources appear in the late 2020s in some scenarios, and generally the HVDC wind option is not selected until early 2030s

And generally the HVDC wind option is not selected until early 2030's, if at all!!!!

This option Strategy E carries the most COST and RISK!

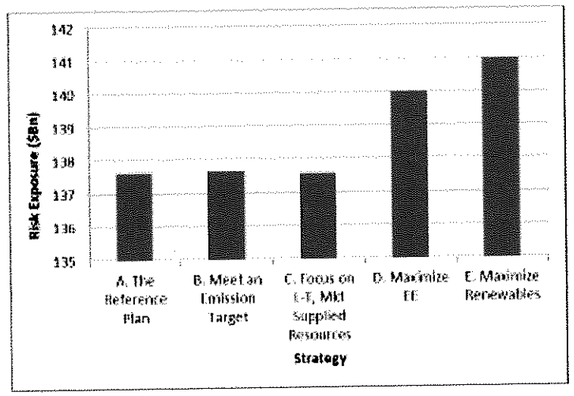


Figure 8-4: Risk Exposure

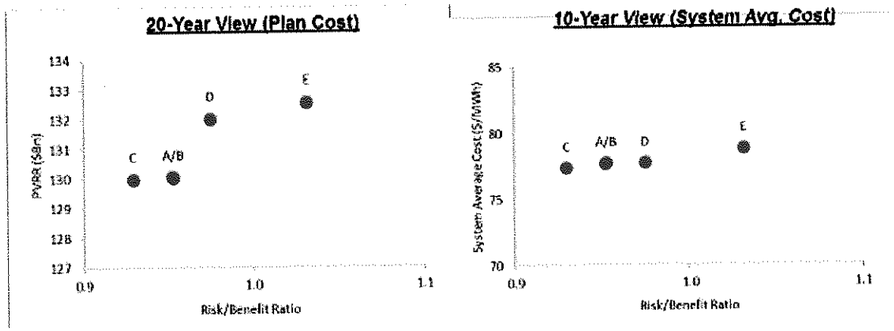


Figure 8-5: Cost/Risk Trade-Offs

Based on these charts, there does not appear to be a trade-off between cost and risk; that is, as cost increases risk also increases. These charts also reinforce the cost and risk assessment results discussed about Strategies D and E having somewhat higher plan costs and exhibit higher financial risks, with Strategy E showing the highest cost and risk outcome.

Technologies and Parameters Reviewed

Power generation and energy storage resources considered in the review included the following, which represent alternatives for new capacity to serve future load:

- Wind energy generation
  - Onshore within the Tennessee Valley
  - Located in Midcontinent Integrated System Operator (MISO) or Southwest Power Pool (SPP)
  - Obtained via High Voltage Direct Current (HVDC) transmission

For wind energy, 16 of the 29 parameter values compared (or 55%) were consistent, with about half of the remaining values showing differences greater than 20%. Recommended outage rates were materially higher than TVA values for all three technology alternatives. Other differences varied by technology, and some potentially offsetting effects are seen.

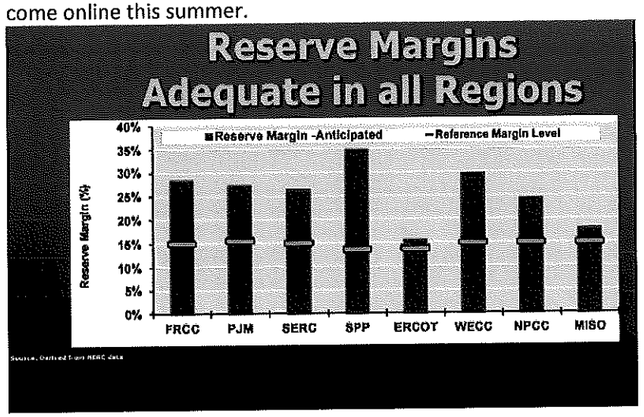
ACCORDING to NERC there is NO NEED.

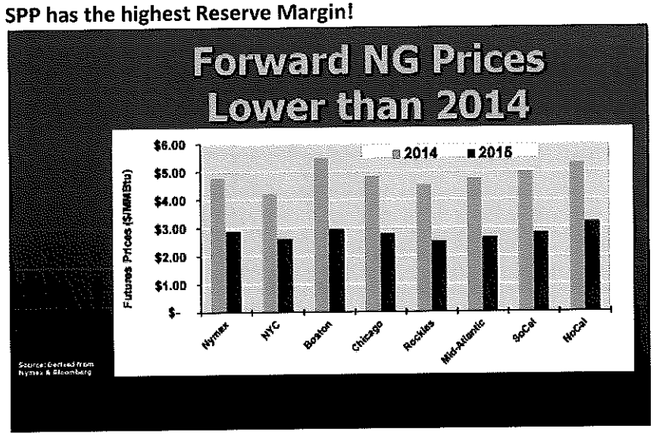
http://ferc.gov/market-oversight/reports-analyses/mkt-views/2015/05-14-15.pdf

2015 NERC Report:

- Market conditions going into the summer will reflect the continued low natural gas prices that have resulted from robust production, as well as the recovery of fuel stockpiles at coal-fired power plants.
- Regional electric system reserve margins are adequate, despite modest growth in load, which is primarily attributable to increased industrial activity.
- Meanwhile, the total generating capacity in the U.S. has decreased by about 3 percent, primarily because of increased coal generator retirements. This is a continuation of the trend that was seen last year. In contrast to coal, NERC forecasts an increase of approximately 3.5 GW in wind

generation capacity over last year, or approximately 6 percent and brings the national wind total to approximately 65 GW. NERC is also projecting a net increase of approximately 2 GW of installed utility-scale solar capacity for this summer, though more solar generation is planned to come online this summer.

- 

- **SPP has the highest Reserve Margin!**
- 

- **Gas is going to be even CHEAPER.** With summer futures prices below $3.00/MMBtu in most regions, natural gas is expected to be competitive with coal on a $/MMBtu basis, when adjusted for the relative efficiency of natural gas versus coal-fired electric generation units. The only region where summer futures are above $3.00/MMBtu is Northern California; however, since the region has no coal-fired plants, it will not experience any coal-to-gas switching. Any further downward price pressure would give natural gas an even greater advantage in the supply stack and is comparable to 2012, when the Henry Hub price dropped to the lowest level in over ten years, averaging $2.65/MMBtu. According to industry estimates, this resulted in 5.1 Bcfd coal-to-gas fuel switching. Estimates for this summer indicate that a $2.50/MMBtu natural gas price could result in 4-5 Bcfd of incremental natural gas demand from power generators.

- **NOT A SINGLE MENTION OF ANY NEEDS OR PROBLEMS IN THE SOUTHEASTERN U.S. This project is NOT NECESSARY.**

STOP RIGHT HERE – CLEP DOES NOT QUALIFY

ii. The proposed Project must be consistent ***with both****:*

(A) Transmission needs identified, in a transmission expansion plan or otherwise, by the appropriate Transmission Organization (as defined in the Federal Power Act, 16 U.S.C. 791a et seq.) if any, or approved regional reliability organization; and

SPP in their 2015 ITP10 Scope included CLEP Plains and Eastern:

"Two new DC interconnections, the Tres Amigas DC Tie and the Clean Line Plains & Eastern project, will be included in the models for sensitivity analysis only."

SPP is NOT incorporating *Clean Line Plains & Eastern* project into their PLAN.

(B) Efficient and reliable operation of the transmission grid;

iii. The proposed Project will be operated in conformance with prudent utility practice;

HVDC through Tornado prone states is not prudent. If you believe climate change is causing more severe weather, this is an even bigger issue. HVDC interconnection with the TVA creates problems integration on their grid. TVA is already utilizing Wind without this project.

STOP RIGHT HERE – CLEP DOES NOT QUALIFY

iv. The proposed Project will be operated by, or in conformance with the rules of, the appropriate Transmission Organization, if any; or if such an organization does not exist, regional reliability organization; and

v. The proposed Project will not duplicate the functions of existing transmission facilities or proposed facilities which are the subject of ongoing or approved siting and related permitting proceedings.

Clean Line fails this very important stipulation in Sec. 1222. Needed transmission is already being undertaken by our regional authorities in AC line where it can truly be a part of the 'grid' unlike this 720 mile one way extension cord of HVDC. Clean Line is unnecessary duplication intended to stimulate construction of generation purposed only to export power between regions. It also fails to present any evidence that there are buyers for this power in other regions.

It's just not true that new generation cannot be built without Clean Line providing a way to get it to "market," considering there is no identified market. Clean Line is in a chicken/egg scenario, supposing if it builds its project that generation and customers will develop, however, Clean Line cannot build without generators and customers developing FIRST.

Section 1222 is not purposed to "permit" transmission lines when a state has denied a permit.

d) Relationship to other laws

Nothing in this section affects any requirement of--

(1) any Federal environmental law, including the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.);

(2) any Federal or State law relating to the siting of energy facilities; or

(3) any existing authorizing statutes.

It simply allows DOE to "participate" in designing, developing, constructing, operating, maintaining or owning transmission. The Arkansas Public Service Commission said, "NO, because Clean Line is NOT a Utility and does not serve AR." Oh, then, the 'AR converter station' suggestion comes on the scene.
STOP RIGHT HERE – CLEP DOES NOT QUALIFY

This has never been used before, so WHERE are the RULES for applying Section 1222? NO decision should be made until there are RULES in place!
Where are

But there is more . . .

If a proposed Project meets the eligibility requirements**, which it does NOT**, DOE and the relevant PMA will conduct an initial evaluation of the eligible Project Proposals, considering criteria including, but not limited to, the following: **WHAT other criteria might appear?**

1. Whether the Project is in the public interest;

First of all – Why do the people, the public, have to prove this is NOT in the public interest? Where is the PROOF that this project is in the public interest? Why doesn't Clean Line or DOE have to prove it? Just saying it is so, does not make it so!

In 2010 when CLEP applied under Sec. 1222 for TWO HVDC lines carrying 7000MW of power they said, "*While the United States has the best renewable resources in the industrialized world, the transmission infrastructure does not yet exist to connect the bulk of these resources, predominantly located in remote areas, to distant load often located near urban centers. New long-haul transmission lines must be built to fully capture the potential of America's vast renewable resources and further the development of a clean energy economy.*" But this is 2015 and this simply isn't true. The urban centers of the Southeastern US do not need the wind power from the Great Plains. The SE is now capable of developing their own wind power according to the DOE. The TVA has studied this and has not agreed to an interconnection.

The wind generation potential in the plains can get on the grid, via the RTO's who can and are upgrading their grid in prudent fashion. CLEP IS NOT NEEDED.

This is NOT in the public interest! There isn't even a legitimate NEED for transmitting via HVDC from OK to TN. There is NO evidence of need and plenty of evidence to the contrary.

A PRIVATE merchant transmission line built for wind farms that do not yet exist to take SOME wind generated power to the TVA and or SWPA that do NOT NEED or want it does not serve the public.

This project servers the venture capitalist seeking to make money via the Federal Government using Eminent Domain. HVDC from OK to TN does not complement, enhance or upgrade the grid but is superfluous. It trespasses on TWO states.

There are so many GOOD ways to utilize wind power but this one is the WORST ideas possible. If they want to build their private project that is independent of any RTO, let them build it if they can without DOE participation, without Federal Eminent Domain!

2. Whether the Project will facilitate the reliable delivery of power generated by renewable resources;

Reliable? NO, 720 miles, 120-1200 ft towers through tornado, thunderstorm, and straight line wind prone country. HVDC – one storm, one tower down and the WHOLE line is OFF LINE.

Reliable? NO, Wind has to be 'gas firmed' according to Clean Line – base load can never be carried by Wind. AND

***According to the TVA**: http://www.tn.gov/tra/orders/2014/1400036p.pdf (also attached)*

Reliability is an issue:

> *"TVA analyzes historic and forecasted wind patterns to determine expected wind deliveries at our system peak. Our forecasting and planning processes reflect adjustment to wind generation at our summer peaks based on this analysis. Clean Line has told us that a production profile provided by the independent meteorology firm, 3Tier Oklahoma, shows that panhandle wind energy produces at about a 50 percent capacity factor between the hours of 4:00 p.m. and 7:00 p.m., thus contributing to meeting peak demand. TVA's current wind resources produced about **25 percent average capacity factor** over that peak period last summer, with significant variation each day (between 5 and 65 percent capacity factor). TVA will take the seasonal and time-of-day energy patterns of wind into account when evaluating adding additional wind energy to its portfolio. **Because wind is an intermittent resource that lacks some of the dispatch capability of other resources, it does not eliminate the need for base load or dispatch-able power plants like nuclear, natural gas, coal and hydropower.** Adding intermittent generation resources like wind can be challenging to manage, particularly as the volume of generation from those sources increases. Wind patterns are fairly predictable, but not entirely so; in addition, weather and other factors can affect output. **To maintain reliability, a wind energy purchaser must keep adequate capacity and spinning reserves to cover the variability inherent to wind. Spinning reserve is typically calculated as the amount of capacity available to cover the loss of the largest generation source on the system.***
>
> *Utilities across the country have been integrating more wind into their systems over the last several years, and **TVA already integrates 1,515 megawatts of off-system wind power**. The industry has growing experience with this issue, but it **does make ensuring reliability more complex.***

If the projection for TVA's electricity demand has changed since September 2013, does it make more sense to purchase this wind power from Clean Line Energy Partners, to build additional nuclear capacity, or to build additional natural gas or coal capacity? While demand over the next decade or so is predicted to be stable with low growth, the TVA generation fleet is in transition. TVA has retired or will retire a substantial portion of its coal fleet; we are committed to the completion of Watts Bar Nuclear Plant Unit 2 and to a large new gas combined cycle plant in Paradise, Kentucky. We have the potential to get incremental megawatts from the hydro system

and a significant amount from power uprates in the nuclear fleet. We have to either retrofit, retire, or replace the Allen Plant in Memphis before 2019 under the terms of an agreement with EPA and others. **(Clean Line cannot supplant Allen because of the need for a generation source physically located in that area to provide transmission support that imported wind generation cannot provide.)** In addition, **other market participants have approached TVA with expressions of interest to provide electricity from gas, nuclear, wind and solar assets.** TVA also factors in energy efficiency and demand response programs into its resource decisions. The recently announced draft 111 (d) rule from EPA, if enacted in its current form, will also have a national impact on future decisions."

TVA is replacing the ALLEN Fossil Fuel plant with Natural GAS, NOT Wind.

TVA doesn't want this:

Officials call Clean Line project 'questionable' http://www.covingtonleader.com/officials-call-clean-line-project-questionable-cms-2715

Jeff Ireland, jireland@covingtonleader.com

Thursday, February 12, 2015 8:12 am

For the second time in a year and a half, the Tipton County Commission made it official: The legislative body does not want the Plains and Eastern Clean Line coming through Tipton County. The commissioners unanimously passed a resolution Monday night that read, in part, "The necessity of this massive project is questionable given TVA's release statement that it has already reached EPA's target system-wide and expects to exceed it." A similar resolution was passed in July of 2013 and area towns have passed resolutions against the power line project. Plains and Eastern Clean Line is planning a 700-mile electric transmission project that would deliver wind energy from the Oklahoma Panhandle region to utilities and customers in Tennessee, Arkansas and other markets in the Southeast. Clean Line Energy Partners LLC, a Houston-based company, is investing $2 billion in the project. **County Executive Jeff Huffman, who drafted the resolution, said Arkansas has rejected the project, but the company is trying to get utility status through the federal government. If that happens, Huffman said, Clean Line could, through eminent domain, take land even if land owners do not want to sell. Huffman said the project is "fueled by groups of billionaire investors who are trying to condemn property for a money-making venture."** The company has proposed installing 200-foot lattice-type towers through South Tipton County. "It's rolling down hill," Huffman said. "I don't think it's fair to the people of Tipton County ... I don't think it (the resolution) will stop them. If somebody decides to try and stop it, this is something they can use."

3. The benefits and impacts of the Project in each state it traverses, including economic and environmental factors;

There are NO REAL benefits but rather a NET NEGATIVE for the states it traverses; there are HUGE economic and environmental damages that are unacceptable. In AR, SWN pays millions in property taxes and has brought jobs and revenue to the local communities in which they work. Hurting SWN is hurting AR, economically.

"**Southwestern Energy Company** (SWN) detailed the significant and negative ways Plains and Eastern could "impact local, regional, and state economies" as proposed. Including:

- that the proposed route would result in a significant reduction in development benefits which "could manifest in increased unemployment, reduced royalty payments, and declines in tax revenue. In Arkansas, SWN has contributed "nearly $2.5 billion in royalty payments, payroll, taxes, and charitable contributions since 2007".
- that the line could affect the 25 existing well pads (with an average profit of $6 million each) located partially or wholly within the 200' ROW on the proposed and alternate routes for Plains and Eastern. Or the additional 91 existing well pads located within 700' of the ROW for the proposed and alternate routes.
- that the line, as routed, would cause a permanent cessation of activity on the 46 wells it crosses over directly.
- that the proposed route crosses gathering lines 87 times for a total of 2 miles of affected gathering line.
- that "stray current from the Plains and Eastern project has the potential to adversely affect pipelines and casings by accelerating corrosion even under normal operating conditions".
- that they were not provided early or direct notice of the line. "This raises the question of how many natural gas operators, pipelines, and other parties with subsurface interests in the vicinity of the Project" have not been adequately or timely notified, or remain unaware of the Project's existence."
- that potential interference with electrical equipment could have serious effects: "failure of this system could result in an over-pressure condition that could lead to an explosion of fire" or "an overflow condition that causes the discharge of such water [salt water produced from the well] into adjacent areas including any environmentally sensitive areas nearby."

Stray Voltage is a real issue: (See Attached File) MO DOT HVDC.pdf

"Effects of Ground Voltage or Stray Current on Infrastructure Caused by High Voltage Direct Current (HVDC) Transmission Lines"

Prepared by Renée McHenry, Transportation Librarian

Prepared for Jim Smith, Design Liaison Engineer

May 29, 2014

"Background: The requester asked for background information concerning the effects of ground voltage produced by a high voltage direct current transmission line and its potential effects on steel or iron products which are part of a state DOT's infrastructure. The requester was contacted by a property owner who is concerned about the proposed Grain Belt Express High Voltage Transmission line."

JOBS? SWN has brought jobs and revenue to the state. Clean Line will NOT. According to the dEIS AR can expect about 108 temporary construction jobs and about 15-30 permanent full time jobs and that is

only if the converter station is built in Pope Co.; which, by the way, Pope County does not want. Clean Line promises HUNDREDS of jobs but it is not true. General Cable CEO has said numerous times, and I have heard him with my own ears in person, that a contract with CL will give them 2 years of work, NO NEW JOBS, just 2 years of work. Wind is turning out to be a job killer in many states.

TAXES? Clean Line tells the press every chance they get that millions of dollars will come to landowners, counties, schools through taxes yet in their application they want SWPA to OWN the line in AR – this would make it EXEMPT from taxes. So, they would not be paying any taxes in AR. If any taxes are ever paid it won't be by Clean Line and it won't be what they promise. Oh, but they want to own the 'transmission' on the line.

Tourism dollars spent in AR has increased 6 fold since 1978. This project trespasses across tourist areas and will have a HUGE NEGATIVE impact on AR Tourism. The EIS did NOT adequately address the losses CLEP wants AR to accept for their private financial gain. The regions the project wants to trespass generated **1.7 Billion dollars of income** for Arkansas in 2014. (See attached File.) Arkansas is working hard to develop and build tourism and this project would have a devastating effect on these efforts. The Mississippi Flyway is a huge source of tourism dollars from duck hunters. This project will have negative and yet unknown effects on the ducks migration too. This negative economic impact is unacceptable to AR.

Property Value loss due to proximity to a HVDC line of this magnitude is an unacceptable cost that should not be placed on the backs of the citizens of OK and AR. Wind farm development or cumulative effects will also bring property value loss and loss of quality of life. Research is new but available on the problems with human beings living near high voltage lines and wind turbines. These disruptions of daily human life are unacceptable. I addressed this in previous comments.

The Poor – are disproportionally affected – millions of dollars of property value will be lost by people with a median income of $32,697. All so that some urban centers can feel good about paying for wind energy, that isn't all wind that they didn't have to sacrifice to generate.

Loss of Quality of LIFE The sight and Sound – Corona Noise around a HVDC line disruptions daily life as well as dropping property value. People who live in the country do so because it is QUIET and there is a VIEW, take those away and you have taken much of the property's value to the owner and the prospective buyer. And, I know 2 people whose homes are near the proposed route that have been told by their doctors that they cannot live near these lines due to the new pacemakers they have. The EIS says in the same section, that in some cases this could be fatal but there are no significant adverse effects on health from this project. Fatal is not acceptable. Or in your opinion, **how many fatalities are OK**?

How many bird and bat deaths are OK? See attached file from the American Bird Conservatory.

Stray Current has not been adequately research. It will affect the land use in and around the ROW.

Soil Erosion can't be fixed once it has occurred, this and clear cutting 8000 acres in AR is not green or clean.

The AR converter station and the MO converter station on the Grain Belt Express were NOT part of Clean Line's original plan. They had no intention of delivering power to AR or MO. AR and MO do not need or want their power and do not want to sacrifice in the name of clean energy for a 'market' Clean wants to tap in the eastern U.S. because they have a 'strong desire for clean energy' so the dEIS says. This is SO UNNECESSARY. Since AR is already and energy EXPORTER, and is developing its own wind power in the state, AR doesn't need a 'little' power off this line. The Proposed site for this unneeded and unwanted converter station is in a wetland! Really? Clean Line seems to do all planning from a desk in Houston via google maps.

4. The technical viability of the Project, considering engineering, electrical, and geographic factors;

Their proposed route goes through canyons, rivers, crosses schools, homes, because NO SURVEY has ever been conducted ON THE GROUND. Even a topographical map would have been good but they obviously didn't use one since there are crazy changes in elevation on the route that are so unnecessary.

The 10 year average is 58 tornadoes a year and some years have over 100. Someone needs to check with NOAA about this, like I did!

Corona Noise is a problem outside the ROW, too. You see, sound travels in all directions and is reflected off the hills around here. Even the frequencies that are below human hearing affect a human being.

5. The financial viability of the Project.

Clean Line's business plan is not **"competitive,"** it **relies on a government-granted right to condemn and take property**. If Clean Line's compensation package was so great, landowners would be falling all over themselves to sign on.

CLEP claims they are assuming all market risk for its project and that should also include the financial risk of **voluntary land acquisition not the use Federal Eminent Domain**. Looking at their other projects they can expect at least 80%-90% condemnation in AR. They claim they will assume market risk but they also have told state regulators that they may "have to" apply to regional planning authorities for cost allocation of its projects in the future. In fact, CLEP has been busy behind the scenes in the past, trying to drum up support for cost allocation of its projects. CLEP seems to think that if they "build it, they will come". SWPP doesn't want or need this new transmission line and doesn't want it forced upon them. Further examination of CLEP's business model notes that the rates it may charge customers include all project costs, **plus profit**. Speaking of customers, there are NONE. NO, not ONE Contract!

According to Daniel Poneman, Letter from DOE to Michael Skelly, April 12, 2005

RE: Advance Funding Agreement

- Clean Line will have a sufficient percentage of its line subscribed to support the Project's financial viability;

So far, they have NONE. They claim they had responses to Open Solicitation representing lots of MW of power but have failed to file a report to FERC demonstrating the results of the Open Solicitation. They have nothing but 'responses'. Those responses could have been, "NO, Thanks!"

FERC

http://www.ferc.gov/CalendarFiles/20140814161029-ER14-2070-000.pdf

http://www.stoppathwv.com/documents/P&ECL-NegotiatedRateAuthority.pdf

1. Applicants also state that, to ensure transparency, the specific rules of the open season, detailed bidding guidelines, evaluation criteria, estimated rates, and proposed form agreements will be posted on its internet website and forwarded to interested parties. Applicants also commit that they will also provide public notice of the open

season in appropriate trade publications. **Additionally, Applicants state that the results of the open season auction will be posted on an internet website.**[1]

(B) **Plains and Eastern are hereby directed to make a compliance filing disclosing the results of the capacity allocation process within 30 days after the close of the open solicitation process, as discussed in the body of this order.**

Where is the report?

Clean Line claims, *"The Project was included as one of the projects considered in SPP's "ITP 20," which is the RTO's 20-year Integrated Transmission Plan that was published in July 2013."*

But it is NOT mentioned at all in this document!
http://www.spp.org/publications/ITP20_Report_01-26-11.pdf

There is record of an interconnection study; that is all.
http://www.spp.org/publications/TWG%2011.7%20&%208.12%20Minutes%20&%20Attachments.pdf

Other Issues:

According to the Advance Funding Agreement Clean is responsible for decommissioning but what will prevent CLEP and any of their LLC's from declaring Bankruptcy or what if they do not even exist in the future?

vii. To the extent Southwestern takes ownership of Project assets, Clean Line will agree to pay for the removal of such assets at the end of the Project's useful life;

viii. Clean Line will hold DOE and Southwestern harmless against any liabilities DOE and Southwestern may incur as the owner of Project assets, and will assume responsibility for achieving and maintaining compliance with the NERC reliability standards, including staffing, and any liabilities resulting from noncompliance with such standards; and

ix. Clean Line will provide such security as is necessary and appropriate to ensure its financial responsibility for its undertakings under this Agreement and subsequent agreements between the Parties relating to the Project.

Where is the evidence of the fulfillment of the Advanced Funding Agreement?

Clean Line's 2010 application is already 'out of date'. Things have changed in the last 5 years that make their justifications for this project null and void. SPP doesn't need this. TVA doesn't need this.

The people in the southeast U.S. don't need this. And the people in OK and AR sure don't need this! There is NO PUBLIC INTEREST to be served with this project.

Clean Line is working on two other projects across the Great Plains. Are they counting all the 'not yet developed but will be developed if they build the line' wind farm capacity for all 3 lines in hope that one will get permitted? The Plains and Eastern, according to Michael Skelly will need wind generations covering an area the size of Rhode Island. What about Grain Belt, what about Rock Island? We cannot carpet all the Great Plains with wind turbines!!!!!

Clean Line in every press release, website and public speech says 4000MW of CHEAP, CLEAN WIND power will . . . Just NOT TRUE! This line can't ever carry 4000MW of wind, it will carry any and all kinds of power, according to FERC; you can't discriminate wind vs coal, gas, nuclear, hydro. The WIND cannot carry the base load! *(Line capacity has changed over the years, 7000 MW then 3500 MW then 4000 MW.)*

Clean Line says they will reduce the use of Coal. No, THEY, won't. TVA doesn't see it that way.

The dEIS rubber stamped every concern, with, "no adverse effects" or called them 'insignificant'; because, the people and the animals and the environment in the **path of profit** are insignificant?

Clean Line is facing the same strong opposition in every state. Today, the Missouri Public Service Commission has denied them a Certification of Public Necessity as Arkansas did.

Strong OPPOSITION in 7 states!

Why are all the landowners in agreement? Why can't they be happy to believe they will get lots of money, their schools will get lots of taxes, and their state will get lots of jobs? Why can't they be happy knowing they will be saving the planet by reducing coal, saving water and securing our energy future with renewables while there will be no adverse effects on their property, their livelihoods, their health, or the environment? Why can't they be happy believing this project improves the electric grid increasing reliability and security?

BECAUSE IT IS NOT TRUE! If all of the above was TRUE – there would NOT be nearly 100% opposition in the landowners. This is NOT about NIMBY. The only people supporting it are MIMPSY – Money in my pocket, S----- You, these people do NOT live near the proposed route but think they may stand to make a buck. I have met some of these people!

Let me describe the opposition: Well educated, tax-paying, hard-working, productive members of society (who do NOT live off the government), who support RENEWABLE energy, Energy Efficiency and would be some of the first to utilize renewables such as Solar and Wind if LOCAL generation and distributed were available. Most of us already have solar electric fence chargers, for example, because we buy solar as it hits the market. We have done real research and are well informed about this project and are more knowledgeable than many of the people directly involved in this project that has already disrupted our lives for over a year and threatens our future and we will never give up the fight. We have attended and spoken at hearings, we have spoken at state legislature hearings, we have spoken at local debates, we have written letters, letters, letters, petitions, phone calls, Fairs, social media updates. We spend far more time on this than it deserves to the detriment of our personal lives but this is what is at stake, our personal lives; our way of life. We are LANDOWNERS, we have invested our wealth in the future, by investing in land not a banking investment firm that makes money off of other people's money; it is our legacy and our children's inheritance. How dare CL use the DOE to try to take our property to make themselves a buck for a project that has NO MERIT?

What we suspected has come true: http://www.stltoday.com/business/local/missouri-regulators-may-block-wind-transmission-project/article_58b169db-7671-50a1-8fd0-5af07f245472.html

Missouri regulators appear poised to scuttle a transmission line that backers say would transmit thousands of megawatts of wind power from the Kansas plains to homes and businesses farther east. The so-called "Grain Belt Express" transmission line is one of several proposed by independent transmission developer Clean Line Energy, of Houston. It has already won regulatory approval in Kansas and Indiana for the project, and it is still waiting on Missouri and Illinois. Only two Missouri Public Service Commissioners signaled support for Grain Belt. The other three signaled they would oppose the line in a formal vote at one of the PSC's next meetings. The line would cross 724 tracts of land in the state, and if the PSC grants it public utility status, it could use eminent domain to acquire easements it can't buy. Hundreds of rural landowners have taken to social media, committee meetings in the Legislature and PSC hearings to voice their opposition to the project. "We're thrilled," said Jennifer Gatrel, who heads the group Block Grain Belt Express. "We think this is a great win for representative democracy, grass-roots activism and landowner rights." Grain Belt has been in the works for years in response to the growing demand for wind power. Of the 4,000 megawatts of power the line could carry, the company says up to 500 megawatts could be offloaded to the grid in Missouri. ***Some commissioners expressed concern Tuesday that it would be a more expensive form of energy. Commissioner Bill Kenney, who said he plans to vote against construction, cast doubts on the economic impact it would have in the state. "I do not see the benefit to Missourians," Kenney said.*** *The issue is bigger than Missouri or the Grain Belt project in particular, said Mark Lawlor, Clean Line's director of development. The country is trying to figure out how to reduce carbon pollution linked to climate change under new federal regulations, which* ***many say*** *will require a large buildout of transmission infrastructure.*

WHO ARE THE MANY? CLEAN LINE AND THEIR INVESTORS?

"How do we get stuff built?" Lawlor said. "If the 'no' was because people didn't like it, landowners didn't like it, then how are we going to build transmission? It kind of goes beyond this one project."

SEE PARAGRAPH ABOVE ABOUT WHY THERE IS OPPOSITION IN 7 STATES.

If the PSC does reject the project, Lawlor said Clean Line won't give up. It could pursue federal eminent domain authority through the Energy Department, an approach it is pursuing in Arkansas after the state declined to approve another of its routes. "These

projects are too valuable and too much in demand (to walk away from)," Lawlor said. "We remain confident in their value and we'll look at everything we can."

Too valuable to who? Clean Line and their investors, not the citizens of the U.S.

At the same meeting, the PSC approved a 7-mile transmission project between Palmyra and the Mississippi River proposed by Ameren Transmission, the final leg of its 380-mile Illinois Rivers project across that state. It is scheduled to be complete in 2018. Last week, Ameren Transmission asked for PSC approval for a 100-mile transmission project across northeast Missouri, scheduled to be complete by 2019. The company hopes for a decision by January.

"Wind power is one of our main reasons for those power lines as well," said Peggy Ladd, Ameren Transmission's director of stakeholder relations.

The Mo Public Service Commission approved 2 transmission projects in MO to accommodate WIND because they are PART OF THE GRID AND LOCAL at the same meeting Clean Line was denied!

Wind is getting on the grid without Clean Line! For Clean Line THIS IS NOT ABOUT WIND, it's about profiteering from Government subsidies and using Federal Eminent Domain for pure profit.

If they had come to AR and worked with Entergy to upgrade the grid to bring on more renewables they would be building transmission lines now instead of 'developing' these projects for years.

Finally, most of the public still doesn't know about this let alone about this PUBLIC COMMENT period. There needs to an extension of the public comment period and PUBLIC HEARINGS on a project that claims to be in the PUBLIC interest.

Sincerely,

Cynthia Callahan

Attachment 2

Attachment 2

EXECUTIVE SUMMARY

The Arkansas Department of Parks and Tourism is charged, both by law and by policy of the State Parks, Recreation and Travel Commission, with increasing tourism to the state. With that in mind, this report provides the tourism industry with current travel marketing information. The first section contains estimates of both traveler expenditures and traveler volume for every county in the state. The second and third sections contain the results of surveys of individuals requesting travel information from the Department. The fourth section summarizes an ongoing survey of travelers stopping at Arkansas Welcome Centers in which every 50th travel party is asked to participate. Section five presents data compiled on all Arkansas Welcome Center visitors from registration data. The most significant results of these projects follow:

The Economic Impact of Travel in Arkansas
The Arkansas tourism industry experienced a year of growth in 2014. This is based on the *2013 U.S. Travel Tourism Expenditure Impact Model*. Travel expenditures increased from $6,267,310,088 in 2013 to $6,698,501,022 in 2014 (6.88%). The number of visitors increased from 24,610,236 in 2013 to 25,885,046 (5.18%). Visitation data from 1997 forward has been adjusted, based on updated data from the *1995 American Travel Survey* (see footnote at the bottom of *Table 1*). A major factor in the success of Arkansas tourism is the 2% Tourism Initiative passed by the General Assembly in 1989. This Act provided additional advertising funds for the Department to compete with surrounding states for potential visitors in the expensive magazine, television, radio, newspaper and Internet markets.

The Effects of the 2014 Spring Advertising Campaign
Travel expenditures per travel party and length of stay in Arkansas were $509.36 and 3.9 nights, respectively. Financial was cited most often as the reason for not traveling Arkansas in 2014. Regardless of whether or not they made a trip, 58.3% of survey respondents plan to visit Arkansas within the next 12 months.

The Internet Conversion Study
Sixty-four percent of survey respondents reported visiting Arkansas during the last 12 months. The average trip lasted 4.8 days, 3.6 of which were spent in Arkansas.

The Welcome Center Survey
The top five states from which visitors to Arkansas Welcome Centers originated were: (1) Texas, (2) Missouri, (3) Arkansas, (4) Illinois and (5) Oklahoma.

The Welcome Center Registration Summary
A total of 816,553 tourists requested assistance from travel consultants during 2014. Tourists' "Reasons for Travel" were as follows: Vacation (49.9%), Passing Through (44.2%), Local Traffic (3.4%) and Business/ Student (2.4%). Tourists stopping at the State Welcome Centers traveled an estimated 101,883,728 miles on Arkansas roads and spent 716,573 travel days in the state during 2014.

NOTE: Differences exist among economic impact, conversion studies and Welcome Center data. Many sources are utilized to gain the most complete picture possible of visitors to Arkansas.

INTRODUCTION

The results of five research projects are contained in this report:

The Economic Impact of Travel in Arkansas
Estimates of traveler expenditures are calculated using the *U.S. Travel Association 2013 Impact of Travel on Arkansas Counties* as a reference point. Arkansas county traveler volume estimates use *Census of Transportation* data as a benchmark, the most recent being the *1995 American Travel Survey*.

The Effects of the 2014 Spring Advertising Campaign Mail Survey
Tourism Division advertising performance is monitored annually through the use of conversion studies. A conversion study is a survey of persons requesting travel information through paid advertising to determine how many actually visited Arkansas. The 2014 spring mail survey consisted of a sample of 5,500 people.

The Internet Conversion Study
Conversion study data for website inquiries was obtained by sending an email questionnaire to 56,121 email addresses of individuals using the Arkansas.com website.

The Welcome Center Survey
Every 50th travel party registered at each of the 13 Welcome Centers located at major entry points to the state is asked to participate in this survey. Travel counselors obtain valuable marketing information about visitors to Arkansas and travelers who are passing through.

The Welcome Center Registration Summary
Every travel party assisted by a travel counselor is registered. Information is recorded concerning their state of origin, number in their travel party, length of stay and Arkansas destination.

The projects listed above relate data on Arkansas visitors in three different ways. The relatively large sample for the *Economic Impact of Travel in Arkansas* was taken from the entire U.S. population. Also, fixed costs such as vehicle depreciation and property taxes were considered in the *Economic Impact of Travel in Arkansas*, but not in others. As a result, the expenditure per traveler is generally higher. The *Effects of the 2014 Spring Advertising Campaign* and the *Internet Conversion Study* had survey populations comprised of people who requested travel information from the Arkansas Department of Parks and Tourism. The *Welcome Center Survey* and *Welcome Center Registration Summary* represent highway travelers who stopped at Welcome Centers on their trip. Much of the traffic on interstates and U.S. highways (where the Welcome Centers are located) is pass-through travel. The average time spent in the state by *Welcome Center Survey* respondents was slightly less than the time spent in the state by those who wrote for information. However, the *Effects of the 2014 Spring Advertising Campaign Mail Survey* is more likely to reflect non-resident vacationers.

Historical Data Patterns in Table 1
Readers will note what sometimes appears to be an inconsistent pattern of growth in some of the Arkansas tourism data presented in *Table 1*. Approximately every five years, the Tourism Division contracts with the U.S. Travel Association to provide data on the economic impact of travel in Arkansas counties. U.S. Travel is a highly respected source of U.S. travel industry statistics. The most recent year this report was purchased from U.S. Travel was 2013, and the complete results by county are presented in *Table 3*. The 2013 U.S. Travel report will serve as a benchmark used by researchers at the Arkansas Department of Parks and Tourism to estimate subsequent years until new county-level data is acquired. Over the years, economists at U.S. Travel make adjustments and revisions to this model to improve accuracy, which sometimes results in numbers that appear to fluctuate over time. There are two reasons why the Department does not purchase this data from U.S. Travel every year. The first is cost, and the second is that there would be a delay of more than a year in reporting. Data marked "preliminary" may be revised when a new benchmark becomes available.

THE ECONOMIC IMPACT OF TRAVEL IN ARKANSAS

During 2014, visitors to Arkansas totaled 25,885,046 person-trips. Visitors spent an average of $258.78 per trip, resulting in over $6.6 billion in total travel expenditures, $334 million in state taxes and $126 million in local taxes. The Arkansas travel industry employed 62,005 persons and paid $1.2 billion in wages and salaries. NOTE: The data in this detailed presentation of travelers and their expenditures are estimates and not actual counts.

Travel Patterns

Arkansas's travel volume in 2014 was 25,885,046 person-trips. The economic impact of travel and tourism on the state's economy is reviewed in *Figure 1* and *Table 1*. *Figure 1* illustrates the growth in U.S. travel spending in Arkansas, 1978-2014. The first column in *Table 1* lists total travel expenditures for the state. The 6.88% increase in travel expenditures in 2014 represents a real increase of 5.18% when adjusted for inflation. Column Two in *Table 1* shows that travel-generated payroll grew from $233,400,000 to $1,209,925,000, an increase of $976,525,000 (418%) during the period of 1978 through 2014. Travel-generated employment shown in Column Three in *Table 1* increased from 46,600 jobs in 1978 to 62,005 jobs in 2014. In 1978, each $25,238 in total travel expenditures supported one job in the industry. However, by 2014, $108,032 in travel expenditures was required to support the same job. The importance of travel-generated taxes on the state and local economies is shown in Columns Four and Five. State travel taxes averaged 5.0% of total travel expenditures in 2014. The number of visitors in person-trips and their average expenditures per person-trip are shown in Columns Six and Seven.

Definition of a Person-Trip

A person-trip occurs, for the purpose of this study, every time one person goes to a place 50 miles or more, each way, from home in one day or is out of town one or more nights in paid or unpaid accommodations and returns to his/her origin. Specifically excluded from this definition are:

1. Travel as part of an operating crew on a train, plane, bus, truck or ship.
2. Commuting to a place of work.
3. Student trips to school or those taken while in school.

The number of person-trips shown in Column Six rose from 14,125,000 in 1978 to 25,885,000 in 2014, an increase of 11,760,000 (83.3%). The number of visitors to Arkansas first exceeded 15 million in 1986. Over 20 million visitors came to Arkansas in 2000, and again each year 2004-2014.

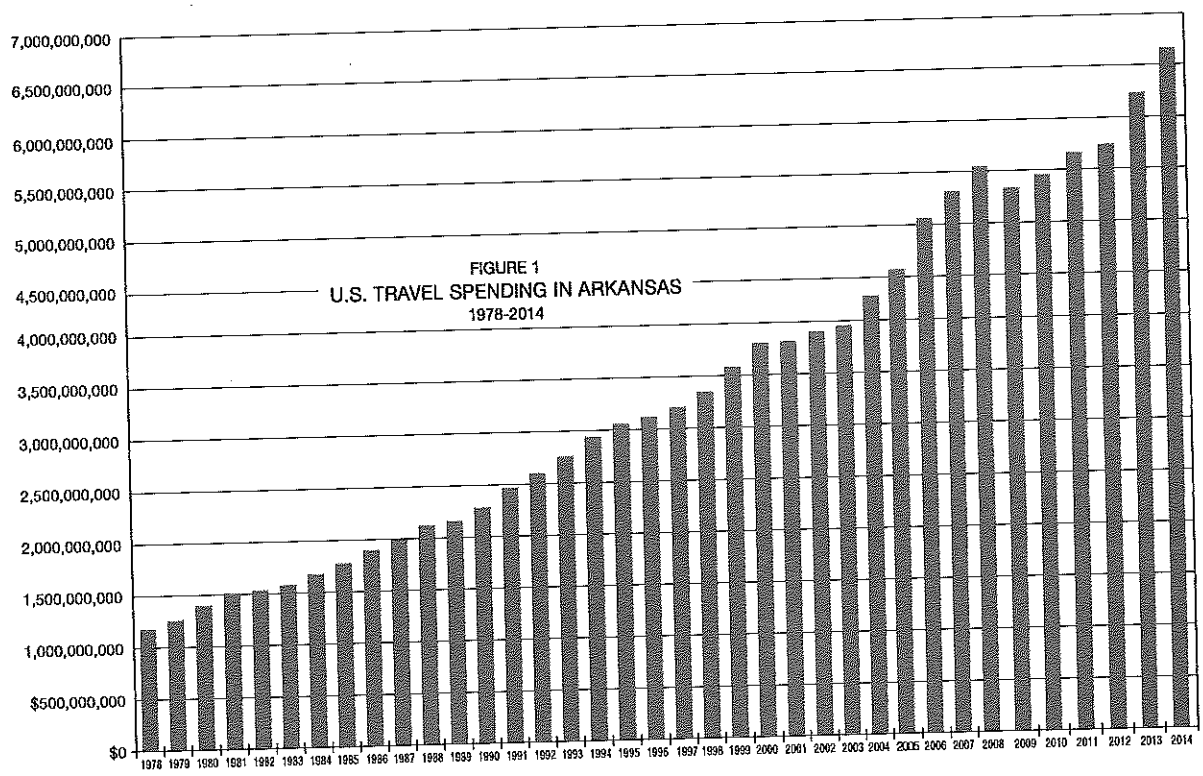


FIGURE 1
U.S. TRAVEL SPENDING IN ARKANSAS
1978-2014

Table 1 – Estimate of the Impact of Travel and Tourism on the Arkansas Economy, 1978-2014

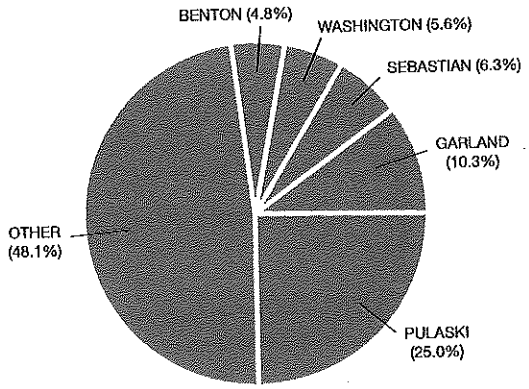
YEAR	TOTAL TRAVEL EXPENDITURES ($1,000)	TRAVEL-GENERATED PAYROLL ($1,000)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX ($1,000)	TRAVEL-GENERATED LOCAL TAX ($1,000)	VISITORS PERSON-TRIPS (Thousands of Persons)	AVERAGE EXPENDITURE PER PERSON-TRIP (Dollars)
1978	$1,176,100	$ 233,400	46,600	$ 47,900	$ 7,325	14,125	$ 83.26
1979	$1,261,261	$ 240,134	44,661	$ 50,891	$ 7,528	13,560	$ 93.01
1980	$1,387,547	$ 261,084	45,311	$ 54,546	$ 9,947	13,601	$102.02
1981	$1,506,379	$ 280,084	45,557	$ 57,654	$ 12,607	13,710	$109.87
1982	$1,536,193	$ 282,200	43,188	$ 57,200	$ 14,700	13,643	$112.60
1983	$1,582,268	$ 291,137	44,557	$ 58,544	$ 15,823	13,799	$144.83
1984	$1,686,698	$ 310,352	46,027	$ 77,588	$ 16,867	14,137	$119.31
1985	$1,781,153	$ 327,732	46,948	$ 81,933	$ 17,812	14,420	$123.52
1986	$1,906,272	$ 345,177	46,918	$ 86,766	$ 23,480	15,141	$125.90
1987	$2,000,000	$ 362,149	47,032	$ 91,157	$ 24,575	15,391	$129.94
1988	$2,112,000	$ 382,429	47,469	$ 96,130	$ 26,014	16,007	$131.94
1989	$2,154,000	$ 390,078	47,500	$ 98,053	$ 26,534	15,591	$138.13
1990	$2,288,000	$ 414,128	47,600	$107,536	$ 27,456	15,709	$145.65
1991	$2,463,831	$ 445,953	47,650	$115,800	$ 29,566	16,259	$151.54
1992	$2,602,980	$ 473,880	45,450	$118,540	$ 50,250	16,723	$155.65
1993	$2,748,357	$ 469,283	45,289	$124,306	$ 52,926	17,158	$160.18
1994	$2,929,710	$ 502,860	46,450	$130,760	$ 55,680	17,818	$164.42
1995	$3,067,406	$ 526,494	46,891	$136,906	$ 58,297	18,356	$167.11
1996	$3,153,293	$ 542,366	46,774	$141,898	$ 59,913	18,264	$172.65
1997	$3,219,512	$ 553,756	46,868	$144,878	$ 61,171	18,336	$175.58
1998	$3,418,800	$ 586,808	47,944	$153,846	$ 64,975	19,178	$178.27
1999	$3,622,218	$ 623,018	48,723	$162,999	$ 68,822	19,801	$182.93
2000	$3,843,174	$ 661,026	49,381	$172,943	$ 73,020	20,336	$188.98
2001	$3,812,245	$ 842,278	57,497	$213,792	$ 78,448	19,848	$192.07
2002	$3,918,987	$ 865,862	57,612	$219,779	$ 80,644	19,927	$196.67
2003	$3,942,501	$ 871,293	57,785	$220,780	$ 82,793	19,668	$200.45
2004	$4,253,959	$ 940,125	59,287	$238,222	$ 89,334	20,691	$205.60
2005	$4,632,561	$1,023,796	60,917	$259,424	$ 97,284	21,829	$212.22
2006	$5,108,407	$ 964,357	59,088	$266,741	$ 97,006	23,350	$218.78
2007	$5,368,936	$1,013,539	59,797	$280,344	$101,953	23,911	$224.54
2008	$5,572,956	$1,052,053	59,677	$290,998	$105,827	23,815	$234.01
2009	$5,377,902	$1,015,231	58,424	$280,813	$102,123	22,839	$235.47
2010	$5,453,193	$1,029,445	58,336	$284,744	$103,553	22,770	$239.49
2011	$5,687,680	$1,073,711	58,657	$296,988	$108,006	23,021	$247.06
2012	$5,767,308	$1,088,743	58,452	$301,146	$109,518	22,860	$252.29
2013 (1)	$6,267,310	$1,132,040	60,440	$322,083	$118,567	24,610	$254.67
2014 (2)	$6,698,501	$1,209,925	62,005	$334,243	$126,725	25,885	$258.78

(1) 2013 data revised; see 2013 U.S. Travel Association benchmark on pages 81-82 of this report.
(2) Data are preliminary and may be revised when new benchmark is received.
Prepared by Research and Information Services Section, Arkansas Department of Parks and Tourism.

THE ECONOMIC IMPACT OF TRAVEL IN ARKANSAS (CONTINUED)

Figure 2 shows the percent of total travel expenditures for the top five counties in 2014. *Table 2* shows travel impact by county for 2014. *Table 3* shows travel impact by county for 2013, the latest benchmark year for Arkansas tourism data. In 2014, two counties dominate the table: Pulaski with $1,676,803,951 and Garland with $686,946,901. They received 25.0% and 10.3% of the state total travel expenditures, respectively. In all, 66 of the 75 counties received more than $10 million in travel expenditures each during 2014, including 15 with more than $100 million each. Five counties had over one million person-trips during 2014. Those counties, their numbers and percent of total trips are: Pulaski with 5,705,853 (22.0%), Garland with 2,744,415 (10.6%), Washington with 1,556,358 (6.0%), Sebastian with 1,401,889 (5.4%) and Benton with 1,388,707 (5.4%).

FIGURE 2
TRAVEL SPENDING IN ARKANSAS COUNTIES
TOP FIVE COUNTIES
2014



Regional Breakdown

Figure 3 is a map of the 12 Arkansas tourism regions, showing their travel expenditures. *Table 4* presents the 2014 travel impact data by region and county.

FIGURE 3
TOTAL TRAVEL EXPENDITURES
BY TOURISM REGION
2014

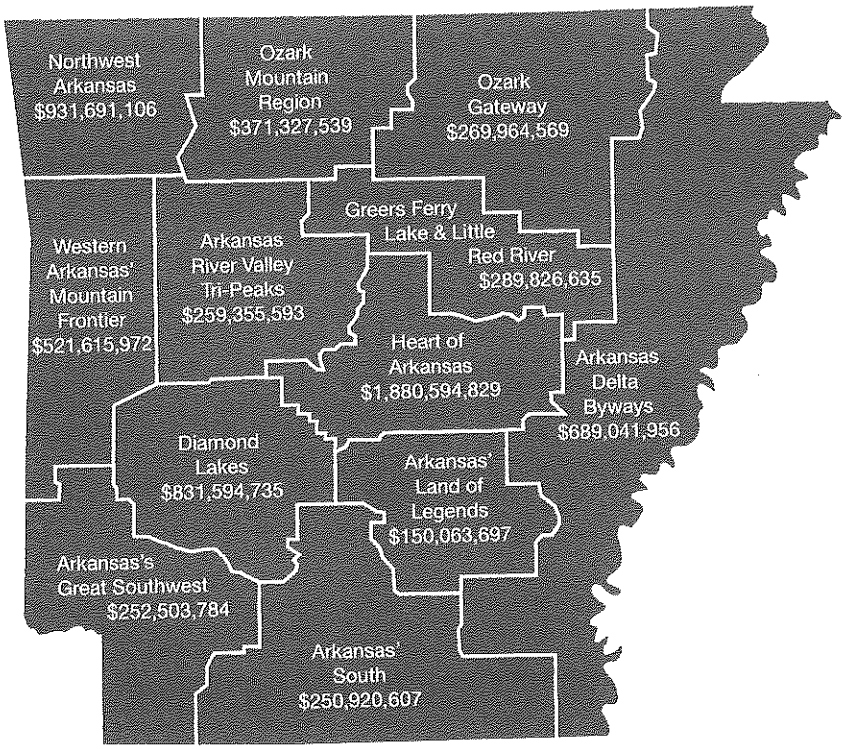


Table 2 – Impact of Travel on Arkansas Counties – 2014 Preliminary*

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS* (Person-Trips)
ARKANSAS	38,029,185	5,895,591	320	2,259,888	825,333	158,232
ASHLEY	30,623,716	5,566,464	326	1,804,195	634,012	128,978
BAXTER	228,700,365	42,033,437	2,231	13,388,407	4,194,324	961,195
BENTON	319,462,363	59,485,363	3,387	20,520,890	7,939,669	1,388,707
BOONE	66,672,240	12,286,091	754	3,959,905	1,279,328	283,397
BRADLEY	12,042,415	1,819,227	84	746,803	335,263	43,381
CALHOUN	3,822,586	369,192	12	229,541	131,836	9,593
CARROLL	227,996,196	47,244,656	3,029	14,222,926	4,245,484	957,429
CHICOT	14,119,153	2,867,562	145	840,066	289,233	57,745
CLARK	57,295,500	11,104,382	578	3,484,743	957,216	242,470
CLAY	17,163,843	2,643,500	137	1,017,288	423,021	68,535
CLEBURNE	162,518,603	26,674,147	1,440	9,599,876	4,592,550	653,306
CLEVELAND	4,650,376	592,403	31	268,389	124,505	13,338
COLUMBIA	31,530,748	5,677,996	314	1,880,812	621,743	127,911
CONWAY	28,425,605	4,913,634	270	1,702,335	645,868	123,342
CRAIGHEAD	106,094,190	20,115,633	1,155	6,372,284	1,732,354	444,808
CRAWFORD	46,317,019	7,698,724	425	2,805,202	797,759	192,775
CRITTENDEN	179,639,589	32,619,037	1,900	10,969,880	3,255,034	754,483
CROSS	15,032,034	2,570,541	141	897,781	284,127	63,807
DALLAS	14,794,106	2,076,985	109	906,451	352,676	60,934
DESHA	24,366,850	4,465,876	275	1,454,401	452,610	105,308
DREW	27,854,326	5,321,730	313	1,668,756	500,891	115,839
FAULKNER	103,156,688	19,041,685	1,061	6,161,810	1,721,496	430,128
FRANKLIN	17,969,851	3,162,764	161	1,082,193	390,464	73,263
FULTON	26,042,491	4,487,431	244	1,551,181	627,691	104,094
GARLAND	686,946,901	117,738,425	7,142	38,557,271	14,241,835	2,744,415
GRANT	6,997,529	865,788	54	421,410	141,187	28,375
GREENE	27,214,985	4,935,082	281	1,614,336	576,833	115,556
HEMPSTEAD	51,857,061	9,800,012	535	3,088,619	1,235,838	208,565
HOT SPRING	36,677,806	5,772,277	301	2,201,038	842,773	145,265
HOWARD	4,550,553	530,144	24	283,226	88,729	19,608
INDEPENDENCE	38,110,101	7,502,288	453	2,268,864	740,987	159,411
IZARD	27,055,143	4,021,106	211	1,600,761	677,447	101,312
JACKSON	16,163,250	2,556,069	141	974,131	291,907	67,061
JEFFERSON	133,181,438	24,400,599	1,356	7,215,958	2,688,381	515,510
JOHNSON	32,951,424	6,167,770	330	1,966,489	640,479	141,625
LAFAYETTE	34,436,417	4,206,525	222	2,041,802	959,485	128,296
LAWRENCE	16,214,972	2,432,513	133	979,813	361,770	67,097
LEE	4,322,754	602,547	36	256,476	120,523	13,485
LINCOLN	5,234,354	730,722	33	319,674	110,162	20,616

Table 2 – Impact of Travel on Arkansas Counties – 2014 Preliminary* (continued)

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS* (Person-Trips)
LITTLE RIVER	24,446,801	3,483,393	193	1,440,682	751,142	95,295
LOGAN	12,886,524	2,236,442	116	796,036	372,292	48,028
LONOKE	37,262,345	6,216,887	317	2,233,863	641,507	147,101
MADISON	11,117,759	1,607,345	73	674,050	290,354	43,617
MARION	51,793,746	10,134,010	554	3,061,644	1,167,823	210,440
MILLER	93,987,419	16,127,634	767	4,306,745	1,393,535	380,539
MISSISSIPPI	107,853,747	22,779,485	1,239	6,461,450	2,141,323	469,235
MONROE	35,145,746	6,191,441	334	2,096,301	635,714	141,091
MONTGOMERY	33,031,087	4,964,329	271	1,942,909	1,025,043	118,955
NEVADA	26,304,950	4,555,873	167	1,113,216	383,623	70,919
NEWTON	13,418,087	2,480,513	147	796,116	311,759	53,337
OUACHITA	32,861,429	5,757,506	315	1,952,023	601,875	146,524
PERRY	20,339,751	2,838,987	129	1,186,364	669,431	72,641
PHILLIPS	29,415,995	4,610,155	279	1,767,120	634,338	118,531
PIKE	17,643,441	3,150,344	189	1,046,519	378,671	71,695
POINSETT	15,751,207	1,699,131	90	975,980	283,136	70,034
POLK	24,776,191	4,433,785	253	1,468,320	525,457	97,388
POPE	155,701,222	23,767,283	1,303	6,642,779	2,182,459	624,676
PRAIRIE	5,315,326	805,085	47	327,841	121,047	21,918
PULASKI	1,676,803,951	317,664,084	12,978	63,883,740	28,586,310	5,705,853
RANDOLPH	18,556,234	2,434,458	132	1,102,442	483,804	81,221
SALINE	58,056,518	10,627,001	629	3,444,202	1,051,388	238,859
SCOTT	7,225,660	1,301,048	68	430,616	175,729	26,221
SEARCY	10,743,100	1,700,048	86	647,950	250,237	52,775
SEBASTIAN	418,883,990	67,170,341	2,989	14,704,021	5,091,846	1,401,889
SEVIER	16,920,583	2,585,614	146	1,004,036	330,994	64,688
SHARP	48,619,530	7,282,613	381	2,865,603	1,264,013	186,855
ST. FRANCIS	47,038,352	8,110,890	419	2,853,529	936,073	195,724
STONE	79,202,849	15,091,252	805	4,577,459	1,674,367	325,164
UNION	125,245,606	14,242,648	917	6,072,281	1,918,031	461,093
VAN BUREN	61,381,748	10,013,405	549	3,787,197	1,764,867	229,948
WASHINGTON	373,114,788	88,307,417	4,283	20,170,867	6,003,638	1,556,358
WHITE	58,818,012	9,653,044	585	3,490,042	1,002,248	238,617
WOODRUFF	7,108,271	942,810	51	423,959	193,367	24,318
YELL	15,494,330	1,962,333	108	908,934	414,564	54,308
TOTALS	**6,698,501,022**	**1,209,924,556**	**62,005**	**344,242,710**	**126,724,835**	**25,885,046**

* Data are preliminary and will be revised when new U.S. Travel Association benchmark is received.
NOTE: Some details may not add due to rounding.

Table 3 – Impact of Travel on Arkansas Counties, 2013 – U.S. Travel Association County Travel Economic Impact Model (CTEIM) – Alphabetical by County

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	STATE TAX RECEIPTS (Dollars)	LOCAL TAX RECEIPTS (Dollars)	VISITORS* (Person-Trips)
ARKANSAS	36,162,133	5,602,888	314	2,144,981	783,294	152,820
ASHLEY	29,120,238	5,290,101	320	1,712,458	601,718	124,567
BAXTER	214,013,221	39,311,191	2,174	12,505,533	3,917,367	913,316
BENTON	298,946,481	55,632,862	3,300	19,167,677	7,415,401	1,319,531
BOONE	62,390,547	11,490,396	734	3,698,777	1,194,852	269,280
BRADLEY	11,451,190	1,728,907	82	708,831	318,186	41,897
CALHOUN	3,577,100	345,282	11	214,404	123,131	9,115
CARROLL	213,354,273	44,184,911	2,951	13,285,021	3,965,148	909,737
CHICOT	13,212,421	2,681,848	142	784,670	270,135	54,869
CLARK	54,482,564	10,553,074	568	3,307,557	908,460	234,177
CLAY	16,061,581	2,472,297	133	950,204	395,088	65,121
CLEBURNE	154,539,714	25,349,834	1,415	9,111,758	4,358,625	630,961
CLEVELAND	4,422,064	562,991	31	254,742	118,163	12,882
COLUMBIA	28,086,787	5,054,875	298	1,672,294	552,761	115,604
CONWAY	27,712,447	4,787,574	269	1,656,570	628,446	122,181
CRAIGHEAD	99,280,818	18,812,867	1,125	5,952,075	1,617,964	422,650
CRAWFORD	43,342,538	7,200,125	414	2,620,218	745,082	183,173
CRITTENDEN	170,820,141	30,999,572	1,867	10,412,103	3,089,236	728,677
CROSS	14,654,902	2,504,593	140	873,645	276,463	63,207
DALLAS	13,844,028	1,942,471	106	846,677	329,389	57,899
DESHA	23,170,554	4,244,155	271	1,380,450	429,556	101,706
DREW	26,486,811	5,057,517	308	1,583,906	475,378	111,877
FAULKNER	98,092,186	18,096,307	1,043	5,848,505	1,633,810	415,416
FRANKLIN	16,815,827	2,957,931	157	1,010,829	364,681	69,613
FULTON	24,370,041	4,196,807	238	1,448,892	586,244	98,909
GARLAND	642,831,151	110,113,233	6,959	36,014,682	13,301,426	2,607,708
GRANT	6,548,148	809,716	52	393,621	131,865	26,961
GREENE	25,878,859	4,690,066	276	1,532,253	547,452	111,604
HEMPSTEAD	49,311,126	9,313,463	526	2,931,574	1,172,890	201,432
HOT SPRING	34,322,356	5,398,442	294	2,055,895	787,124	138,029
HOWARD	4,258,316	495,810	23	264,549	82,870	18,631
INDEPENDENCE	37,153,973	7,309,816	450	2,207,868	720,999	157,911
IZARD	25,726,864	3,821,467	208	1,519,369	642,941	97,847
JACKSON	15,369,712	2,429,165	139	924,600	277,039	64,767
JEFFERSON	124,628,522	22,820,323	1,321	6,740,115	2,510,863	489,831
JOHNSON	30,835,283	5,768,322	322	1,836,813	598,188	134,570
LAFAYETTE	33,572,456	4,098,606	221	1,986,911	933,602	127,089
LAWRENCE	15,418,894	2,311,744	130	929,993	343,343	64,802
LEE	4,045,147	563,524	35	239,563	112,565	12,813
LINCOLN	4,898,204	683,398	32	298,594	102,888	19,589

Table 3 – Impact of Travel on Arkansas Counties, 2013 – U.S. Travel Association
County Travel Economic Impact Model (CTEIM) – Alphabetical by County (continued)

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	STATE TAX RECEIPTS (Dollars)	LOCAL TAX RECEIPTS (Dollars)	VISITORS* (Person-Trips)
LITTLE RIVER	23,833,465	3,394,026	192	1,401,951	730,880	94,399
LOGAN	12,253,857	2,125,407	114	755,561	353,329	46,386
LONOKE	34,869,356	5,814,257	308	2,086,555	599,147	139,774
MADISON	9,774,575	1,412,333	68	591,524	254,781	38,900
MARION	48,467,550	9,477,693	540	2,859,750	1,090,710	199,958
MILLER	82,617,868	14,168,454	723	3,778,792	1,222,590	339,323
MISSISSIPPI	100,927,377	21,304,198	1,207	6,035,361	1,999,929	445,861
MONROE	32,888,685	5,790,460	325	1,958,064	593,737	134,063
MONTGOMERY	30,909,830	4,642,820	264	1,814,787	957,358	113,029
NEVADA	24,615,645	4,260,817	163	1,039,807	358,292	67,386
NEWTON	12,556,377	2,319,866	143	743,617	291,173	50,680
OUACHITA	30,751,067	5,384,628	307	1,823,301	562,132	139,225
PERRY	19,341,166	2,698,038	127	1,126,042	635,333	70,156
PHILLIPS	27,971,810	4,381,270	274	1,677,268	602,027	114,477
PIKE	16,510,379	2,946,316	184	977,508	353,667	68,123
POINSETT	14,739,664	1,589,089	88	911,621	264,440	66,546
POLK	23,559,798	4,213,657	249	1,393,662	498,692	94,057
POPE	148,057,034	22,587,289	1,280	6,305,019	2,071,293	603,310
PRAIRIE	4,973,976	752,945	46	306,222	113,054	20,826
PULASKI	1,569,119,553	297,090,940	12,644	59,671,043	26,698,716	5,421,629
RANDOLPH	17,364,552	2,276,793	128	1,029,743	451,858	77,175
SALINE	56,599,963	10,354,364	626	3,351,609	1,023,026	236,612
SCOTT	6,761,628	1,216,787	66	402,220	164,126	24,914
SEARCY	10,053,178	1,589,946	84	605,222	233,714	50,146
SEBASTIAN	368,276,807	59,020,884	2,817	12,903,759	4,468,013	1,250,275
SEVIER	15,833,943	2,418,160	142	937,827	309,138	61,466
SHARP	46,232,543	6,921,047	374	2,719,898	1,199,630	180,464
ST. FRANCIS	44,017,548	7,585,598	409	2,665,358	874,263	185,975
STONE	74,116,440	14,113,884	785	4,275,607	1,563,806	308,967
UNION	115,751,109	13,155,306	888	5,601,626	1,769,199	432,613
VAN BUREN	58,368,197	9,516,261	540	3,594,632	1,674,972	222,083
WASHINGTON	354,796,630	83,923,145	4,208	19,145,254	5,697,838	1,503,126
WHITE	55,930,328	9,173,791	574	3,312,586	951,197	230,455
WOODRUFF	6,759,289	896,002	50	402,402	183,518	23,486
YELL	14,499,283	1,835,245	105	848,996	387,190	51,603
TOTALS	**6,267,310,088**	**1,132,040,191**	**60,440**	**322,083,374**	**118,567,398**	**24,610,236**

* Visitation data derived by Research and Information Services Section of Arkansas Department of Parks and Tourism.
Note: Details may not add due to rounding.

Table 4 – Impact of Travel on Arkansas Tourism Regions by County – 2014 Preliminary*

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS (Person-Trips)
NORTHWEST ARKANSAS						
BENTON	319,462,363	59,485,363	3,387	20,520,890	7,939,669	1,388,707
CARROLL	227,996,196	47,244,656	3,029	14,222,926	4,245,484	957,429
MADISON	11,117,759	1,607,345	73	674,050	290,354	43,617
WASHINGTON	373,114,788	88,307,417	4,283	20,170,867	6,003,638	1,556,358
TOTALS	**931,691,106**	**196,644,781**	**10,771**	**55,588,734**	**18,479,145**	**3,946,111**
OZARK MOUNTAIN REGION						
BAXTER	228,700,365	42,033,437	2,231	13,388,407	4,194,324	961,195
BOONE	66,672,240	12,286,091	754	3,959,905	1,279,328	283,397
MARION	51,793,746	10,134,010	554	3,061,644	1,167,823	210,440
NEWTON	13,418,087	2,480,513	147	796,116	311,759	53,337
SEARCY	10,743,100	1,700,048	86	647,950	250,237	52,775
TOTALS	**371,327,539**	**68,634,099**	**3,773**	**21,854,023**	**7,203,471**	**1,561,145**
OZARK GATEWAY						
FULTON	26,042,491	4,487,431	244	1,551,181	627,691	104,094
INDEPENDENCE	38,110,101	7,502,288	453	2,268,864	740,987	159,411
IZARD	27,055,143	4,021,106	211	1,600,761	677,447	101,312
JACKSON	16,163,250	2,556,069	141	974,131	291,907	67,061
LAWRENCE	16,214,972	2,432,513	133	979,813	361,770	67,097
RANDOLPH	18,556,234	2,434,458	132	1,102,442	483,804	81,221
SHARP	48,619,530	7,282,613	381	2,865,603	1,264,013	186,855
STONE	79,202,849	15,091,252	805	4,577,459	1,674,367	325,164
TOTALS	**269,964,569**	**45,807,730**	**2,500**	**15,920,254**	**6,121,988**	**1,092,215**
WESTERN ARKANSAS' MOUNTAIN FRONTIER						
CRAWFORD	46,317,019	7,698,724	425	2,805,202	797,759	192,775
FRANKLIN	17,969,851	3,162,764	161	1,082,193	390,464	73,263
LOGAN	6,443,262	1,118,221	58	398,018	186,146	24,014
POLK	24,776,191	4,433,785	253	1,468,320	525,457	97,388
SCOTT	7,225,660	1,301,048	68	430,616	175,729	26,221
SEBASTIAN	418,883,990	67,170,341	2,989	14,704,021	5,091,846	1,401,889
TOTALS	**521,615,972**	**84,884,883**	**3,954**	**20,888,370**	**7,167,401**	**1,815,550**
ARKANSAS RIVER VALLEY TRI-PEAKS						
CONWAY	28,425,605	4,913,634	270	1,702,335	645,868	123,342
JOHNSON	32,951,424	6,167,770	330	1,966,489	640,479	141,625
LOGAN	6,443,262	1,118,221	58	398,018	186,146	24,014
PERRY	20,339,751	2,838,987	129	1,186,364	669,431	72,641
POPE	155,701,222	23,767,283	1,303	6,642,779	2,182,459	624,676
YELL	15,494,330	1,962,333	108	908,934	414,564	54,308
TOTALS	**259,355,593**	**40,768,229**	**2,198**	**12,804,920**	**4,738,947**	**1,040,605**
GREERS FERRY LAKE/LITTLE RED RIVER						
CLEBURNE	162,518,603	26,674,147	1,440	9,599,876	4,592,550	653,306
VAN BUREN	61,381,748	10,013,405	549	3,787,197	1,764,867	229,948
WHITE	58,818,012	9,653,044	585	3,490,042	1,002,248	238,617
WOODRUFF	7,108,271	942,810	51	423,959	193,367	24,318
TOTALS	**289,826,635**	**47,283,406**	**2,625**	**17,301,074**	**7,553,033**	**1,146,188**

Table 4 – Impact of Travel on Arkansas Tourism Regions by County – 2014 Preliminary* (continued)

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS (Person-Trips)
HEART OF ARKANSAS						
FAULKNER	103,156,688	19,041,685	1,061	6,161,810	1,721,496	430,128
LONOKE	37,262,345	6,216,887	317	2,233,863	641,507	147,101
PRAIRIE	5,315,326	805,085	47	327,841	121,047	21,918
PULASKI	1,676,803,951	317,664,084	12,978	63,883,740	28,586,310	5,705,853
SALINE	58,056,518	10,627,001	629	3,444,202	1,051,388	238,859
TOTALS	**1,880,594,829**	**354,354,742**	**15,033**	**76,051,457**	**32,121,748**	**6,543,859**
DIAMOND LAKES						
CLARK	57,295,500	11,104,382	578	3,484,743	957,216	242,470
GARLAND	686,946,901	117,738,425	7,142	38,557,271	14,241,835	2,744,415
HOT SPRING	36,677,806	5,772,277	301	2,201,038	842,773	145,265
MONTGOMERY	33,031,087	4,964,329	271	1,942,909	1,025,043	118,955
PIKE	17,643,441	3,150,344	189	1,046,519	378,671	71,695
TOTALS	**831,594,735**	**142,729,757**	**8,482**	**47,232,480**	**17,445,538**	**3,322,799**
ARKANSAS' LAND OF LEGENDS						
CLEVELAND	4,650,376	592,403	31	268,389	124,505	13,338
GRANT	6,997,529	865,788	54	421,410	141,187	28,375
JEFFERSON	133,181,438	24,400,599	1,356	7,215,958	2,688,381	515,510
LINCOLN	5,234,354	730,722	33	319,674	110,162	20,616
TOTALS	**150,063,697**	**26,589,512**	**1,474**	**8,225,432**	**3,064,235**	**577,839**
ARKANSAS'S GREAT SOUTHWEST						
HEMPSTEAD	51,857,061	9,800,012	535	3,088,619	1,235,838	208,565
HOWARD	4,550,553	530,144	24	283,226	88,729	19,608
LAFAYETTE	34,436,417	4,206,525	222	2,041,802	959,485	128,296
LITTLE RIVER	24,446,801	3,483,393	193	1,440,682	751,142	95,295
MILLER	93,987,419	16,127,634	767	4,306,745	1,393,535	380,539
NEVADA	26,304,950	4,555,873	167	1,113,216	383,623	70,919
SEVIER	16,920,583	2,585,614	146	1,004,036	330,994	64,688
TOTALS	**252,503,784**	**41,289,197**	**2,055**	**13,278,326**	**5,143,347**	**967,910**
ARKANSAS' SOUTH						
ASHLEY	30,623,716	5,566,464	326	1,804,195	634,012	128,978
BRADLEY	12,042,415	1,819,227	84	746,803	335,263	43,381
CALHOUN	3,822,586	369,192	12	229,541	131,836	9,593
COLUMBIA	31,530,748	5,677,996	314	1,880,812	621,743	127,911
DALLAS	14,794,106	2,076,985	109	906,451	352,676	60,934
OUACHITA	32,861,429	5,757,506	315	1,952,023	601,875	146,524
UNION	125,245,606	14,242,648	917	6,072,281	1,918,031	461,093
TOTALS	**250,920,607**	**35,510,019**	**2,076**	**13,592,107**	**4,595,436**	**978,413**

Table 4 – Impact of Travel on Arkansas Tourism Regions by County – 2014 Preliminary* (continued)

COUNTY	TOTAL TRAVEL EXPENDITURES (Dollars)	TRAVEL-GENERATED PAYROLL (Dollars)	TRAVEL-GENERATED EMPLOYMENT (Jobs)	TRAVEL-GENERATED STATE TAX (Dollars)	TRAVEL-GENERATED LOCAL TAX (Dollars)	VISITORS (Person-Trips)
ARKANSAS DELTA BYWAYS						
ARKANSAS	38,029,185	5,895,591	320	2,259,888	825,333	158,232
CHICOT	14,119,153	2,867,562	145	840,066	289,233	57,745
CLAY	17,163,843	2,643,500	137	1,017,288	423,021	68,535
CRAIGHEAD	106,094,190	20,115,633	1,155	6,372,284	1,732,354	444,808
CRITTENDEN	179,639,589	32,619,037	1,900	10,969,880	3,255,034	754,483
CROSS	15,032,034	2,570,541	141	897,781	284,127	63,807
DESHA	24,366,850	4,465,876	275	1,454,401	452,610	105,308
DREW	27,854,326	5,321,730	313	1,668,756	500,891	115,839
GREENE	27,214,985	4,935,082	281	1,614,336	576,833	115,556
LEE	4,322,754	602,547	36	256,476	120,523	13,485
MISSISSIPPI	107,853,747	22,779,485	1,239	6,461,450	2,141,323	469,235
MONROE	35,145,746	6,191,441	334	2,096,301	635,714	141,091
PHILLIPS	29,415,995	4,610,155	279	1,767,120	634,338	118,531
POINSETT	15,751,207	1,699,131	90	975,980	283,136	70,034
ST. FRANCIS	47,038,352	8,110,890	419	2,853,529	936,073	195,724
TOTALS	**689,041,956**	**125,428,202**	**7,065**	**41,505,534**	**13,090,545**	**2,892,413**
STATE TOTALS	**6,698,501,022**	**1,209,924,556**	**62,005**	**344,242,710**	**126,724,835**	**25,885,046**

* Data are preliminary and will be revised when new benchmark is received.
Note: Some details may not add due to rounding.

THE EFFECTS OF THE 2014 SPRING ADVERTISING CAMPAIGN

During the first seven and a half months of 2014, the Tourism Division received 119,137 requests for travel information that were associated with the Tourism Division's Spring 2014 Advertising Campaign. A mail survey, often referred to as a conversion study, was conducted. Selected were 5,500 of the individuals who made requests for travel information during the campaign. This survey was used to determine how many had actually visited Arkansas. Here are a few major points from the analysis:

- The overall conversion rate decreased to 41.7% from 47.4% in 2013.
- Average length of total trips increased significantly, by 24.5%, or 6.1 nights in 2014 compared to 4.9 nights in 2013.
- Total dollars spent increased by 18.1%, to $796.69.
- Average dollars spent in Arkansas was $509.36, 15.6% more than 2013.
- Average family income slightly decreased compared to last year, to $51,620.65 from $52,199.50 in 2013.
- Those who plan to visit Arkansas within the next 12 months decreased to 58.3% in 2014, compared to 63.5% in 2013.
- The average reported length of time to receive an Arkansas Vacation Planning Kit was 17.6 days, slightly longer than 2013.
- Twenty percent visited the Arkansas website, down from 34.2% in 2013.
- Interest in using the information received for reading about lodging and attractions in 2014 may have increased greatly from 2013. New recording methods have made multiple selections possible. This may account for the change.
- Financial considerations were the reason cited most often for those unable to travel in Arkansas. Those who listed financial considerations decreased to 28.7% in 2014, compared to 30.9% in 2013.

Table 5 summarizes responses for each question in both the 2013 and 2014 surveys. To keep costs down, only a limited number of media are surveyed each year. The *2014 Spring Conversion Study* included 10 media. The media is rotated annually so that most major media will be surveyed within a two-year period. For a list of publications surveyed to date, see *Table 6*. During the campaign, the Tourism Division selected the following eight magazines to be studied: *AARP, Better Homes and Gardens, Endless Vacation, Family Fun, Guideposts, Midwest Living, Outside* and *Southern Living*. One newspaper project *Preprint* inserts and one television project *Engage TV* were selected to be studied.

The results of the study, by publication, are contained in *Table 7*. An assessment of each publication by an index entitled the *Ratio of Travel Expenditures to Cost* is given in *Table 8*. *Figure 4* illustrates how Arkansas information was used in planning trips, and *Figure 5* compares reasons given in 2013 and 2014 for not visiting Arkansas. Some publications have a higher cost-per-inquiry than in previous years, and this can be attributed to increased frequency and/or larger ads. It is important to note that ratio of travel expenditures to cost is only one measurement.

FIGURE 4
HOW INFORMATION WAS USED IN PLANNING
SPRING 2014

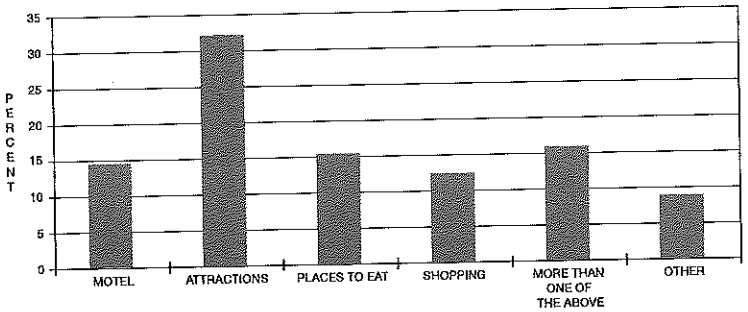


FIGURE 5
REASONS FOR NOT TRAVELING ARKANSAS

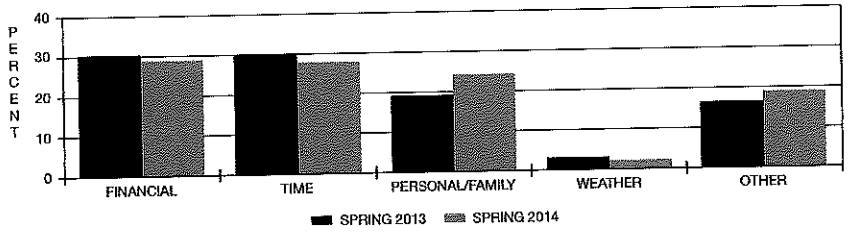


Table 5 – Spring Conversion Study Summary, 2014 and 2013

QUESTION	2014	2013
1. Visited Arkansas	41.7%	47.4%
2. Average travel party size	2.7	2.2
3a. Average nights away from home	6.1	4.9
3b. Average nights spent in Arkansas	3.9	3.2
4. Average trip expenditures:		
Total	$796.69	$674.50
Arkansas	$509.36	$440.49
5.* Information used in planning for:		
Motel	14.6%	1.9%
Attractions	32.6%	21.1%
Places to eat	15.9%	0.6%
Shopping	12.5%	0.3%
More than one of the above	16.1%	65.8%
Other	8.4%	10.3%
6. Needed additional information	10.8%	14.4%
7. Average time from initial request to receipt (days)	17.6	16.1
8. Average trip planning time before trip (weeks)	7.9	5.5
9. Requested information from other states	54.7%	59.4%
10. Visited other states	52.7%	64.5%
11. For those unable to travel in Arkansas, reasons cited:		
Financial	28.7%	30.9%
Time	27.1%	30.4%
Personal/family	23.3%	19.5%
Weather	1.9%	2.5%
Other	19.0%	16.7%
12. Plan to visit Arkansas within the next 12 months	58.3%	63.5%
13. Visited the Arkansas website	20.4%	34.2%
14. Average family income	$51,620.65	$52,199.50

* New reporting methods allow more than one answer to be selected, which may account for changes between 2013 and 2014.
Source: 2014 and 2013 Conversion Studies, Arkansas Department of Parks and Tourism.

Table 6 – Publications Surveyed and Conversion Rate by Year Surveyed

	SPRING 2005	FALL 2005	SPRING 2006	FALL 2006	SPRING 2007	FALL 2007	SPRING 2008	FALL 2008	SPRING 2009	FALL 2009	SPRING 2010	FALL 2010	SPRING 2011	FALL 2011	SPRING 2012	FALL 2012	SPRING 2013	FALL 2013	SPRING 2014
MAGAZINES																			
AAA Living			46.6																
AARP Magazine		46.9		41.7		43.2	37.2		35.4	44.8	46.2	39.3	61.2	57.3	43.1	48.0	27.7	24.2	32.8
American Legacy					24.7		•												
Arthur Frommer's Budget Travel			38.7				41.7		36.4		39.7								
Audubon			27.9																33.0
Better Homes & Gardens											59.0								
Cooking Light											32.6								
Cooking with Paula Deen											47.0								
Endless Vacation			53.6		36.6		48.2				56.9		39.9		26.2		34.0		47.2
Family Circle	41.5		40.9									41.7	57.1	53.3	50.8				
Family Fun					43.0								37.3				31.5		•
Good Housekeeping	47.3		37.3		43.8								45.1						
Guideposts													29.3		33.7	39.9	27.7	•	•
Home and Away					52.1							32.2							
Midwest Living	46.1			43.9	41.7		39.0	29.8	45.0		47.9		50.6	52.1	61.4	42.6	38.8	31.3	44.1
Midwest Traveler			51.9												68.3				
National Geographic Adventure	29.4		33.9		28.7		29.8												
National Geographic Traveler	38.2			33.6	32.7		33.3		29.3	35.4	37.5				31.7	35.8			
Oprah					26.2	54.8	•	31.4	•			44.4							
Outside				26.2					•	•			•		29.6		•	•	•
People	30.8		•		•														
Rand McNally														53.3					
Smithsonian	25.9		32.5			33.3	30.4		30.8	25.0	32.4				69.0				
Southern Living		50.0		47.5				46.1	53.4		57.9	60.4	64.2	57.3		54.4	52.5	39.5	40.3
Southern Traveler					64.2		63.0												
Texas Monthly			61.2																
travelinformation.com*	46.5				50.6		51.8		63.9		•		•		49.9		•		
USA Weekend	41.2		46.7																
Woman's Day			48.0										47.8						

Table 6 – Publications Surveyed and Conversion Rate by Year Surveyed (continued)

	SPRING 2005	FALL 2005	SPRING 2006	FALL 2006	SPRING 2007	FALL 2007	SPRING 2008	FALL 2008	SPRING 2009	FALL 2009	SPRING 2010	FALL 2010	SPRING 2011	FALL 2011	SPRING 2012	FALL 2012	SPRING 2013	FALL 2013	SPRING 2014
NEWSPAPERS																			
Preprint		67.6	63.8		66.9	68.2	75.6	74.2	73.9		76.4		87.4		80.9		70.9		72.5
Midwest Vacation Guide			61.3		54.0														
TELEVISION																			
Television-General			73.0				65.4		63.3		79.2		69.2		81.6		70.6		
Pay-Per-Inquiry		52.0	48.6		54.8	53.8	60.6	55.7									•	•	•
Engage TV																			
OTHER																			
coolsavings.com			52.6																
Innovation Ads			36.4																
Relationserve Internet			•																

• Insufficient Response
* Formerly Rand McNally

	GRAND TOTAL	SUBTOTAL MAGAZINE	AARP	BETTER HOMES & GARDENS	ENDLESS VACATION	ENGAGE TV
Visited Arkansas	41.7%	37.0%	32.8%	33.0%	47.2%	•
Average travel party size	2.7	2.5	1.8	2.9	2.7	•
Average nights away from home:						
Total	6.1	6.5	5.6	6.9	7.4	•
Arkansas	3.9	4.0	3.4	3.8	4.2	•
Average trip expenditures	$796.69	$837.15	$864.13	$999.00	$728.25	•
Information requested was used in planning for:						
Motel	14.6%	14.6%	14.1%	13.7%	11.7%	•
Attractions	32.6%	32.6%	34.5%	32.9%	34.8%	•
Eat	15.9%	16.2%	11.7%	17.4%	14.5%	•
Shop	12.5%	12.6%	13.1%	13.7%	10.5%	•
More than one of the above	16.1%	15.7%	14.6%	15.1%	18.8%	•
Other	8.4%	8.4%	12.1%	7.3%	9.8%	•
Needed additional information	10.8%	11.8%	14.3%	15.9%	9.5%	•
Average time from initial request to receipt (days)	17.6	18.6	19.6	17.9	18.1	•
Average planning time (weeks) before a trip	7.9	9.6	7.4	10.1	9.0	•
Requested information from other states	54.7%	64.1%	60.2%	71.9%	60.9%	•
Visited other states	52.7%	53.9%	42.7%	47.1%	73.6%	•
For those unable to travel in Arkansas, reasons cited:						
Financial	28.7%	28.5%	36.7%	32.5%	15.2%	•
Time	27.1%	26.3%	24.5%	20.8%	39.2%	•
Personal/family	23.3%	23.3%	18.4%	36.4%	22.8%	•
Weather	1.9%	1.9%	2.0%	2.6%	0.0%	•
Other	19.0%	20.1%	18.4%	7.8%	22.8%	•
Plan to visit Arkansas within the next 12 months	58.3%	57.2%	63.6%	46.8%	48.8%	•
Visited the Arkansas website	20.4%	16.8%	15.7%	14.3%	16.9%	•
Average income	$51,620.65	$48,962.00	$44,999.00	$40,780.53	$66,160.30	

	FAMILY FUN	GUIDEPOSTS	MIDWEST LIVING	OUTSIDE	PREPRINT	SOUTHERN LIVING
Visited Arkansas	•	•	44.1%	•	72.5%	40.3%
Average travel party size	•	•	2.3	•	2.9	2.8
Average nights away from home:						
Total	•	•	6.4	•	4.5	6.0
Arkansas	•	•	3.5	•	3.8	3.0
Average trip expenditures	•	•	$726.36	•	$643.65	$892.29
Information requested was used in planning for:						
Motel	•	•	15.2%	•	13.8%	18.3%
Attractions	•	•	33.1%	•	32.8%	32.7%
Eat	•	•	16.9%	•	14.2%	17.5%
Shop	•	•	13.9%	•	13.8%	10.4%
More than one of the above	•	•	12.9%	•	19.0%	15.5%
Other	•	•	7.9%	•	6.3%	5.6%
Needed additional information	•	•	14.0%	•	7.8%	6.8%
Average time from initial request to receipt (days)	•	•	11.2	•	13.1	18.0
Average planning time (weeks) before a trip	•	•	7.6	•	6.5	7.6
Requested information from other states	•	•	79.7%	•	25.0%	73.4%
Visited other states	•	•	69.6%	•	49.7%	65.1%
For those unable to travel in Arkansas, reasons cited:						
Financial	•	•	18.0%	•	29.1%	27.2%
Time	•	•	30.3%	•	34.5%	21.7%
Personal/family	•	•	23.6%	•	23.6%	22.8%
Weather	•	•	3.4%	•	1.8%	0.0%
Other	•	•	24.7%	•	10.9%	28.3%
Plan to visit Arkansas within the next 12 months	•	•	69.2%	•	64.9%	63.0%
Visited the Arkansas website	•	•	15.9%	•	45.0%	21.0%
Average income	•	•	$50,217.04	•	$62,812.31	$54,843.09

• Insufficient Response

Table 8 – Ratio of Travel Expenditures Generated to the Cost of 2014 Spring Advertising Campaign

MEDIA	TOTAL NUMBER OF INQUIRIES	AD COST	PERCENT THAT CAME TO ARKANSAS	ESTIMATED NUMBER OF TRIPS (COL. 2 X COL. 4)	AVERAGE TRAVEL EXPENDITURES IN ARKANSAS*	ESTIMATED TRAVEL EXPENDITURES (COL. 5 X COL. 6)	RATIO OF TRAVEL EXPENDITURES TO COST (COL. 7 ÷ COL. 3)
AARP	3,026	$ 75,310.00	32.8	993	$524.65	$ 520,730.17	6.9
Better Homes & Gardens	2,173	$ 64,514.00	33.0	717	$550.17	$ 394,524.21	6.1
Endless Vacation	777	$ 35,528.00	47.2	367	$413.33	$ 151,586.69	4.3
Family Fun	916	$ 38,926.00	29.7	272	$496.38	$ 135,039.81	3.5
Guideposts	1,080	$ 36,990.00	28.3	306	$628.54	$ 192,108.22	5.2
Midwest Living	2,154	$ 122,710.00	44.1	950	$397.23	$ 377,332.56	3.1
Outside	1,511	$ 38,386.00	15.8	239	$749.67	$ 178,973.92	4.7
Southern Living	2,923	$ 124,645.00	40.3	1,178	$446.15	$ 525,544.98	4.2
SUBTOTAL MAGAZINE	**14,560**	**$ 537,009.00**	**36.9**	**5,373**	**$513.78**	**$ 2,760,343.04**	**5.1**
Preprint	8,253	$ 168,287.00	72.5	5,983	$543.53	$ 3,252,170.99	19.3
Engage TV	17,168	$ 98,000.00	46.2	7,932	$521.75	$ 4,138,320.65	42.2
TOTALS ALL MEDIA SURVEYED	**39,981**	**$ 803,296.00**	**41.7**	**16,672**	**$509.36**	**$ 8,492,089.14**	**10.6**
TOTALS ALL MEDIA	**119,137**	**$5,045,814.00**	**41.7**	**49,680**	**$509.36**	**$25,305,070.51**	**5.0**

* Average travel expenditures in Arkansas obtained by multiplying the ratio of time spent in Arkansas to the total time on trip, by the total trip expenditures.
NOTE: Totals may not add due to rounding.

THE ARKANSAS SPRING INTERNET CONVERSION STUDY AND THE WELCOME CENTER SURVEY

The Arkansas Spring Internet Conversion Study

The Arkansas Department of Parks and Tourism website received 4,157,432 visits during the January through August 15, 2014, Spring/Summer advertising campaign. An Internet Conversion Study was conducted in October 2014. The entire available population was included in this study. The survey instrument, along with a letter from the Tourism Director, was emailed to 56,121 households during October 2014. The survey response rate was 12.37% with 6,942 responses. Results are summarized below.

- Over three-fourths (78.6%) located the Arkansas Department of Parks and Tourism website via either a search engine (54.3%) or website link (24.3%).
- 34.2 percent printed one or more pages from the website, down from 39.0% in Spring 2013.
- 63.7% of respondents reported visiting Arkansas during the last 12 months.
- The average duration of the trip was 4.8 nights. Most (3.63 nights) of the trip was spent in Arkansas. In 2013, trip duration was 4.8 nights, and those spent in Arkansas was 3.7.
- The median Spring expenditure per trip was $673.68, up 8.36% percent from $621.72 in 2013, with $509.47 of the total spent in Arkansas, up 5.3% from $483.85 in 2013.
- Those requesting that additional information be sent to them received it in 12 days, well within the median trip planning time of 9.71 weeks.
- Over three-fourths (78.3%) reported visiting the websites of other states.
- 82.7 percent said they plan to visit Arkansas within the next 12 months.
- The median reported family income in Spring 2014 was $82,621, up 43.0% from $57,773.32.

The Welcome Center Survey

The *Welcome Center Survey* is an ongoing project initiated January 1, 1981. The purpose of the survey is to gain insights into the nature of Arkansas travelers and their travel habits. Survey forms are completed at all 13 Arkansas State Welcome Centers. Every 50th travel party registered at each Center is asked to be included in the survey, and the sample size for 2014 was 10,811. *Table 10* contains a comparison of the 2013 and 2014 *Welcome Center Surveys Summary*.

It should be noted that those persons traveling through Arkansas to reach a final destination beyond the state are also included. This affects the totals, but no effort was made to separate them from other travelers, in order to maintain the integrity of the data. All 50 states and the District of Columbia are included in the survey. Foreign visitors are excluded.

- The top states of origin are shown in *Figure 6* and in *Table 10*. Leading the list are Texas, Missouri, Arkansas, Illinois and Oklahoma. These five states account for 54.2% of the total.
- The median age of those stopping for assistance at Arkansas Welcome Centers during 2013 was 55.3 years.
- Travel parties stopping for assistance consisted of 72% family members traveling together and 27% individual travelers.
- When asked the main purpose of their trip, those surveyed responded in order of preference: visiting friends or relatives (42%), sightseeing (16%), recreation (11%), business (10%), entertainment (9%), family affairs (7%) and other (5%).
- Those surveyed indicated their trip lasted 6.8 nights, with 3.3 (48.5%) of those nights spent in Arkansas.
- The majority (73%) considered the trip to be a vacation.
- The top five Arkansas counties listed as a final destination are Garland, Pulaski, Benton, Carroll and Washington.

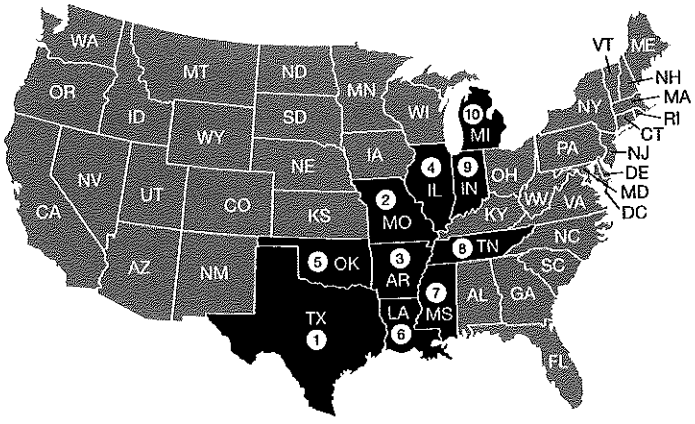


FIGURE 6
WELCOME CENTER SURVEY TOP 10 STATES OF ORIGIN
2014

Table 9 – 2014 Spring Internet Conversion Study

QUESTION	2014 VACATION KIT ONLY	2014 SPECIALTY BROCHURES	2014 ALL RESPONSES	2013 STUDY
1. Learned of the website from:				
Banner ad	0.7%	0.6%	0.7%	0.8%
Direct e-mail	4.1%	3.1%	4.0%	4.3%
Website link	24.3%	21.2%	24.3%	24.9%
Search engine	55.2%	56.7%	54.3%	52.8%
Social media	2.5%	1.9%	2.9%	3.0%
Television	5.9%	5.5%	5.8%	6.4%
Newspaper	1.3%	1.3%	1.2%	1.7%
Radio	0.6%	0.5%	0.6%	0.7%
Magazine	5.4%	9.4%	6.3%	5.4%
Top 3 magazines mentioned:				
AARP	22.5%	17.1%	16.8%	17.3%
Southern Living	14.5%	4.9%	11.3%	13.3%
AAA Tourbook	11.6%	2.4%	7.8%	7.1%

	2014 VACATION KIT ONLY	2014 SPECIALTY BROCHURES	2014 NEWSLETTER	2014 BANNER ADS	2014 KEYWORD	ALL RESPONSES	2013 STUDY
2. Printed pages from Arkansas website	33.2%	32.4%	36.0%	*	34.0%	34.2%	39.0%
3. Visited Arkansas	62.6%	64.1%	65.5%		62.5%	63.7%	69.3%
4. Travel party composition:							
Under 18	22.6%	16.6%	19.8%		22.1%	20.8%	21.2%
18-24	4.7%	4.6%	5.9%		4.2%	5.0%	5.6%
25-34	9.4%	9.6%	7.9%		7.0%	8.5%	9.7%
35-44	11.2%	11.2%	12.2%		9.7%	11.3%	11.7%
45-54	15.7%	18.2%	19.6%		14.4%	17.2%	17.1%
55-64	19.8%	27.6%	21.1%		22.7%	21.7%	20.3%
65 and over	16.5%	12.2%	13.5%		19.9%	15.5%	14.4%
5a. Average nights away from home	4.8	4.8	4.8		4.8	4.8	4.8
5b. Average nights in Arkansas	3.6	3.6	3.6		3.6	3.6	3.7
6. Activities participated in:							
Sightseeing	18.8%	19.1%	17.8%		19.0%	18.5%	17.9%
Shopping	11.1%	10.0%	10.4%		11.3%	10.7%	11.0%
Attractions	12.9%	10.8%	10.6%		13.0%	11.9%	11.5%
Historic sites	12.4%	10.8%	11.2%		11.8%	11.7%	11.5%
Museums	7.5%	5.3%	5.8%		6.6%	6.5%	6.3%
Live performance	3.0%	2.3%	2.7%		2.67%	2.8%	2.6%
Arts/crafts show	2.8%	2.9%	2.6%		3.0%	2.8%	3.0%
Camping	5.5%	5.6%	6.2%		5.9%	5.8%	6.4%
Hiking	6.4%	6.4%	6.5%		6.7%	6.4%	6.8%
Fishing/hunting	3.9%	5.0%	5.7%		4.6%	4.8%	5.4%
Antiques	3.6%	3.7%	3.1%		3.4%	3.4%	3.5%
Golf	0.7%	0.9%	0.9%		0.4%	0.7%	0.7%
Water sports	3.3%	3.3%	4.0%		3.1%	3.5%	3.2%
Festivals	2.6%	2.7%	3.3%		2.7%	2.9%	3.1%
Birding	1.0%	0.9%	1.1%		1.1%	1.1%	1.4%
Sporting events	0.7%	0.6%	0.6%		0.6%	0.6%	0.7%
Racing	0.3%	0.2%	0.3%		0.1%	0.3%	0.5%
Other	2.3%	2.7%	1.9%		2.4%	2.2%	4.4%

Table 9 – 2014 Spring Internet Conversion Study (continued)

	2014 VACATION KIT ONLY	2014 SPECIALTY BROCHURES	2014 NEWSLETTER	2014 BANNER ADS	2014 KEYWORD	ALL RESPONSES	2013 STUDY
7. Average trip expenditures:							
Total	$680.07	$713.55	$645.65	•	$685.80	$673.68	$621.72
Arkansas	$509.70	$537.75	$488.97		$518.64	$509.47	$483.85
8. Primary purpose of trip:							
Visiting friends or relatives	15.1%	13.9%	12.9%		12.7%	13.8%	14.0%
Vacation	75.6%	72.4%	74.5%		75.2%	74.8%	72.6%
Business	1.6%	2.1%	1.6%		1.7%	1.7%	1.9%
Student	0.5%	0.9%	0.5%		1.0%	0.6%	0.7%
Other	7.3%	10.7%	10.5%		9.5%	9.2%	10.8%
9. Information used in planning for:							
Making hotel/motel reservation	15.3%	13.7%	14.2%		15.2%	14.7%	14.6%
Locating Arkansas attractions	39.8%	39.6%	38.4%		38.4%	39.0%	38.8%
Selecting places to eat	15.7%	16.0%	15.7%		15.6%	15.7%	15.6%
Finding places to shop	11.1%	9.5%	9.3%		10.6%	10.2%	10.5%
All of the above	12.3%	13.2%	15.1%		13.6%	13.6%	13.5%
Other	6.0%	8.1%	7.4%		6.6%	6.9%	7.0%
10. Average time for additional information to arrive (days)	12.8	11.1	11.6		13.3	12.3	12.2
11. Average trip planning time before trip (weeks)	9.8	7.5	7.4		10.2	9.7	9.6
12. Visited other state websites	79.7%	75.8%	75.9%		81.9%	78.3%	78.1%
Top 10 state websites visited:							
	MO 5.9%	MO 7.0%	TX 6.6%		MO 6.7%	MO 6.1%	MO 6.4%
	TN 5.9%	TX 5.7%	TN 6.1%		TN 6.1%	TX 5.9%	TX 5.9%
	TX 5.7%	CO 5.7%	MO 5.7%		TX 5.5%	TN 5.9%	TN 5.6%
	CO 4.8%	TN 5.3%	CO 5.4%		FL 5.0%	CO 5.1%	CO 4.6%
	FL 4.5%	FL 4.4%	FL 4.7%		CO 4.8%	FL 4.6%	FL 4.6%
	OK 4.3%	LA 3.6%	OK 4.4%		OK 4.1%	OK 4.2%	LA 4.1%
	LA 3.9%	OK 3.5%	LA 3.7%		LA 3.8%	LA 3.8%	OK 4.1%
	AL 3.3%	KY 3.2%	KY 3.1%		AL 3.4%	AL 3.2%	MS 3.2%
	MS 3.1%	NC 3.0%	AL 3.0%		GA 3.3%	GA 3.0%	AL 3.1%
	GA 2.9%	GA 2.8%	GA 3.0%		KY 3.2%	KY 3.0%	GA 2.9%

Table 9 – 2014 Spring Internet Conversion Study (continued)

	2014 VACATION KIT ONLY	2014 SPECIALTY BROCHURES	2014 NEWSLETTER	2014 BANNER ADS	2014 KEYWORD	ALL RESPONSES	2013 STUDY
13. Requested information from other states	61.2%	52.5%	52.3%	•	63.4%	57.4%	58.5%
Top 10 states from which information was requested:							
	MO 6.1%	CO 6.5%	TX 6.3%		MO 6.6%	MO 6.1%	MO 6.3%
	TN 5.7%	MO 6.3%	MO 5.8%		TN 6.2%	TX 5.9%	TX 5.9%
	TX 5.7%	TN 5.6%	TN 5.8%		TX 5.9%	TN 5.8%	TN 5.6%
	CO 4.8%	TX 5.5%	CO 5.5%		CO 5.2%	CO 5.3%	CO 4.7%
	OK 4.3%	FL 3.8%	OK 4.6%		FL 4.9%	OK 4.4%	OK 4.2%
	FL 3.8%	OK 3.6%	FL 4.3%		OK 4.6%	FL 4.1%	FL 4.2%
	AL 3.7%	LA 3.5%	LA 3.4%		LA 4.0%	LA 3.6%	LA 3.8%
	LA 3.7%	AL 3.2%	AZ 3.1%		AL 3.7%	AL 3.5%	AL 3.4%
	MS 3.1%	KY 2.9%	KY 3.1%		KY 3.3%	KY 3.0%	MS 3.1%
	AZ 2.9%	GA 2.6%	AL 3.0%		GA 3.2%	AZ 2.8%	KY 2.9%
14. Visited other states	73.5%	73.1%	71.3%		71.8%	72.4%	71.3%
Top 10 states visited:							
	MO 7.4%	MO 8.9%	MO 8.2%		MO 8.5%	MO 8.0%	MO 8.7%
	TX 6.5%	TX 6.5%	TX 7.0%		TN 6.2%	TX 6.5%	TX 6.3%
	TN 5.8%	TN 5.6%	TN 6.0%		TX 5.7%	TN 5.9%	TN 6.0%
	OK 5.0%	OK 4.6%	OK 5.0%		FL 5.0%	OK 4.9%	OK 5.1%
	FL 5.0%	CO 4.2%	FL 4.8%		OK 4.4%	FL 4.8%	FL 4.6%
	LA 4.2%	FL 4.2%	LA 4.5%		MS 3.8%	LA 4.2%	LA 4.2%
	MS 4.1%	MS 4.0%	MS 3.6%		LA 3.7%	MS 3.9%	MS 4.1%
	IL 3.4%	IL 3.8%	IL 3.5%		IL 3.5%	IL 3.5%	AL 3.5%
	AL 3.3%	KY 3.7%	CO 3.4%		GA 3.4%	CO 3.2%	GA 3.3%
	GA 3.0%	LA 3.7%	KY 3.2%		AL 3.3%	AL 3.2%	IL 3.2%
15. For those unable to travel in Arkansas, reasons cited:							
Financial	20.1%	18.2%	23.0%		22.2%	21.2%	26.7%
Time	33.8%	42.2%	37.2%		33.0%	35.9%	32.8%
Personal/family	19.5%	15.7%	14.8%		19.5%	17.4%	17.1%
Weather	2.0%	3.3%	3.9%		4.3%	3.2%	3.4%
Other	24.6%	20.6%	21.0%		21.1%	22.3%	20.0%
16. Plan to visit Arkansas within the next 12 months	77.7%	87.7%	88.1%		78.9%	82.7%	82.2%
17. Average family income	$61,542.71	$87,054.60	$82,792.36		$61,901.54	$82,621.61	$57,773.32

• Insufficient Response

Table 10 – Comparison of the 2014 and 2013 Welcome Center Surveys

TOP 15 STATES OF ORIGIN, 2014 AND 2013

STATE OF ORIGIN	2014 RANK	2014 PERCENT OF TOTAL	2013 RANK	2013 OF TOTAL
Texas	1	18.7%	1	19.6%
Missouri	2	12.5%	2	11.0%
Arkansas	3	8.9%	13	2.2%
Illinois	4	7.7%	4	7.5%
Oklahoma	5	6.4%	5	6.5%
Louisiana	6	6.0%	3	8.1%
Mississippi	7	5.0%	6	4.4%
Tennessee	8	3.8%	8	3.0%
Indiana	9	2.7%	12	2.5%
Michigan	10	2.6%	7	3.8%
Florida	11	2.2%	11	2.5%
Kansas	12	2.0%	10	2.6%
Wisconsin	13	2.0%	9	2.9%
Alabama	14	1.7%	20	1.4%
Minnesota	15	1.7%	15	1.9%
Other		16.1%		20.0%

AVERAGE AGE

Median for All Members of the Travel Party

2014 – 55.3

2013 – 57.5

DESCRIPTION OF TRAVEL PARTY

	2014	2013
Family	72%	73%
Individual	27%	27%
Business	*	*
Motor home	*	*
Other	*	*

FIRST TRIP TO ARKANSAS

2014 – 8.4%

2013 – 11.0%

METHOD OF CONTACTING DEPARTMENT PRIOR TO TRIP

	2014	2013
Internet	95%	14%
Phone	3%	1%
Mail	2%	*
Did not contact	*	85%

PURPOSE OF TRIP

	2014	2013
Visit friends	42%	38%
Sightseeing	16%	26%
Recreation	11%	14%
Business	10%	6%
Entertainment	9%	8%
Family affairs	7%	5%
Other	5%	2%

NIGHTS AWAY FROM HOME

	2014	2013
1	5%	6%
2	11%	12%
3	11%	12%
4	11%	10%
5	9%	9%
6	9%	9%
7	9%	8%
8+	35%	35%
Median Nights:	6.8	6.2

Table 10 – Comparison of the 2014 and 2013 Welcome Center Surveys (continued)

NIGHTS SPENT IN ARKANSAS

	2014	2013
1	26%	28%
2	20%	19%
3	15%	16%
4	12%	12%
5	6%	5%
6	9%	8%
7	4%	3%
8+	9%	8%
Median Nights:	3.30	3.20

VACATIONERS

2014 – 73%
2013 – 84%

TOP 10 ARKANSAS COUNTIES AS FINAL DESTINATION

	2014	2013
Garland	1	1
Pulaski	2	2
Benton	3	4
Carroll	4	3
Washington	5	6
Fulton	6	20
Stone	7	5
Baxter	8	7
Pike	9	8
Boone	10	10

AVERAGE TRIP DISTANCE

2014 – 823 miles
2013 – 590 miles

ACTIVITIES PARTICIPATED IN

	2014	2013
Sightseeing	76%	89%
Shopping	61%	58%
Attractions	48%	57%
Historic sites	25%	33%
Museums	20%	26%
Hiking	11%	10%
Live performance	10%	14%
Arts/crafts show	9%	12%
Fishing/hunting	9%	5%
Camping	7%	12%
Water sports	6%	14%
Antiques	5%	2%
Birding	4%	6%
Festivals	4%	1%
Sporting events	3%	3%
Golf	2%	3%
Racing	1%	7%

AVERAGE EXPENDITURE PER TRIP

2014 – $777
2013 – $847

WHAT MOST INFLUENCED TRIP

	2014	2013
Shortest route	42%	27%
Previous visit	36%	48%
Friend/relative	11%	14%
Business	7%	4%
Advertisement	5%	7%

* Denotes less than 1 percent.
Note: Details may not add due to rounding.
Source: 2014 and 2013 Arkansas State Welcome Center Surveys.

WELCOME CENTER REGISTRATION SUMMARY

During 2014, a talented staff of travel consultants assisted 816,553 visitors at the 13 Arkansas State Welcome Centers. In addition to providing customized travel information to visitors, the Welcome Centers collect a wealth of marketing and research data. *Figure 7* compares 2014 and 2013 visitor totals by month. Of those who stopped for assistance, 49.9% were on vacation, while 44.2% were passing through. "Reasons for Travel" is summarized in *Table 13* and by *Figure 8*. The top five regions visited in Arkansas by those who stopped for information were: Heart of Arkansas, Northwest Arkansas, Diamond Lakes, Arkansas Delta Byways and Western Arkansas' Mountain Frontier.

FIGURE 7
WELCOME CENTER VISITORS BY MONTH 2013-2014

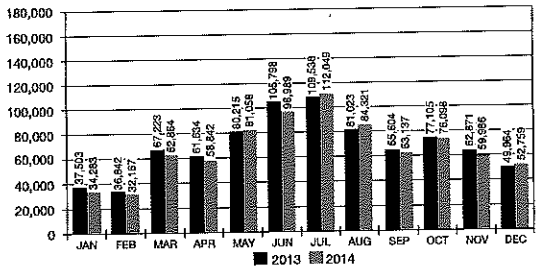
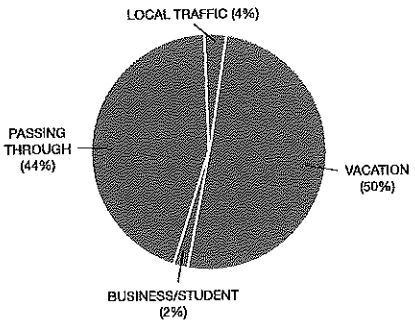


FIGURE 8
WELCOME CENTER VISITORS BY REASONS FOR TRAVEL
2014



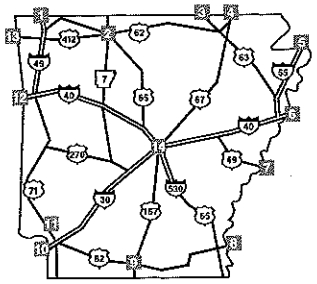
A very important indicator of the effectiveness of Arkansas's Welcome Centers is the estimated mileage increase that travel consultants track while assisting visitors. Visitors seek out the experience and knowledge available at the Welcome Centers and will alter their plans accordingly. And this becomes increased time and money spent by the visitors. Travel Consultants track the estimated mileage increase of their efforts as a measure of quantifying their impact. Travel Consultants estimate their impact on travel to increase total mileage in Arkansas by 3.2%.

United States visitors to Arkansas State Welcome Centers decreased 2.1% in 2014, while foreign visitation decreased 8.5% from 2013 totals. The top five countries of origin and their percent of total foreign visitation are depicted in *Figure 9*. See *Table 17* for the complete breakdown of foreign visitors.

ARKANSAS STATE WELCOME CENTER UPDATES

NAME	DATE OPENED	UPDATED
1. Bentonville	7-29-67	–
2. Harrison	5-17-88	*
3. Mammoth Spring	3-16-87	–
4. Corning	8-19-68	2/14/06
5. Blytheville	4-07-75	5/12/09
6. West Memphis	11-24-71	5/28/13
7. Helena-West Helena	2-8-78	11/19/13
8. Lake Village	6-30-80	5/18/09
9. El Dorado	1-10-69	11/5/04
10. Texarkana	1-13-69	12/16/04
11. Red River	12-08-88	*
12. Van Buren/Fort Smith	4-27-70	5/24/05
13. Siloam Springs	6-24-92	–

** Welcome Centers scheduled to begin updates in 2015*
– Updates unscheduled



The Department of Parks and Tourism Central Office at 1 Capitol Mall in Little Rock is a working 14th Welcome Center that answers phone calls and mailed requests providing information on scenic, historic and recreational points of interest within the state for Arkansas travelers. In addition, this Welcome Center serves as the reception area for the Arkansas Department of Parks and Tourism central office.

Arkansas State Welcome Centers are jointly operated by the Arkansas Department of Parks and Tourism and the Arkansas Highway and Transportation Department. See pages 58-59 for an update on the rebuilding program currently in progress.

FIGURE 9
WELCOME CENTER FOREIGN VISITORS
TOP FIVE COUNTRIES 2013

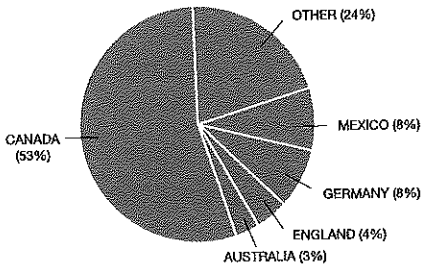


Table 11 – Welcome Center Summary Table 2014

	TOTAL VEHICLES	TOTAL VISITORS	VISITORS/ VEHICLES	TOTAL MILES IN ARKANSAS TRAVELED BY VISITORS	INCREASE IN MILES TRAVELED AS RESULT OF TRAVEL COUNSELING	TOTAL DAYS SPENT IN ARKANSAS
Bentonville	13,039	25,707	1.97	3,259,320	31,560	33,601
Blytheville	47,712	114,490	2.40	10,633,489	548,619	72,310
Corning	29,983	57,343	1.91	8,529,058	94,200	69,123
El Dorado	14,235	37,114	2.61	4,714,770	468,935	30,466
Harrison	28,614	68,125	2.38	9,401,498	147,460	69,699
Helena-West Helena	13,792	25,046	1.82	3,068,564	60,590	22,780
Lake Village	23,821	54,471	2.29	7,293,670	292,450	43,179
Mammoth Spring	27,989	73,259	2.62	4,647,484	16,912	45,732
Red River	7,749	16,320	2.11	1,989,397	47,650	17,844
Siloam Springs	10,211	21,050	2.06	1,442,518	16,569	19,557
Texarkana	81,261	187,600	2.31	29,799,585	955,165	176,566
Van Buren/Fort Smith	37,525	86,691	2.31	10,694,495	272,690	79,031
West Memphis	21,166	49,337	2.33	6,409,880	324,420	36,685
TOTALS	**357,097**	**816,553**	**2.29**	**101,883,728**	**3,277,220**	**716,573**

Table 12 – Travel Parties Registered by Hours of Operation and Welcome Center 2014

HOURS OF OPERATION	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
8 - 9 AM	667	3,179	1,906	1,728	2,395	1,101	1,656	1,087	661	1,195	5,560	2,106	1,455	24,696
9 - 10 AM	1,205	4,663	2,985	1,865	3,369	1,345	1,999	2,119	788	1,196	8,016	3,256	1,977	34,783
10 - 11 AM	1,772	5,687	3,826	2,160	4,263	1,879	2,761	3,329	1,129	1,531	9,688	4,463	2,609	45,097
11 - 12 AM	1,922	5,738	4,137	1,704	4,475	2,062	3,113	3,863	1,053	1,442	10,589	5,074	2,657	47,829
12 - 1 PM	1,663	5,562	3,833	1,604	3,690	1,813	2,982	4,100	1,037	1,231	10,006	4,917	2,568	45,006
1 - 2 PM	1,635	5,759	3,489	1,295	3,364	1,745	2,948	3,780	964	1,146	9,450	4,416	2,393	42,384
2 - 3 PM	1,501	5,919	3,407	1,240	2,847	1,655	3,024	3,787	932	1,004	9,489	4,517	2,584	41,906
3 - 4 PM	1,299	5,297	2,950	1,178	2,565	1,609	2,689	3,084	955	742	9,080	4,166	2,327	37,941
4 - 5 PM	1,060	4,689	2,517	1,232	1,330	583	2,064	2,199	230	574	7,368	3,571	2,028	29,445
5 - 6 PM	315	1,219	933	229	316	–	585	641	–	150	2,015	1,039	568	8,010
TOTALS	**13,039**	**47,712**	**29,983**	**14,235**	**28,614**	**13,792**	**23,821**	**27,989**	**7,749**	**10,211**	**81,261**	**37,525**	**21,166**	**357,097**

Table 13 – Visitors by Reasons for Travel and Welcome Center 2014

REASON FOR TRAVEL	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
Vacation	16,523	38,799	25,112	23,551	41,531	9,971	14,688	39,889	9,242	14,451	119,244	36,958	17,874	407,833
Passing Through	5,396	72,604	29,650	8,815	23,908	9,541	37,947	21,303	5,637	3,719	66,881	46,815	28,973	361,189
Local Traffic	2,379	337	884	2,395	1,492	2,714	927	11,406	447	1,481	580	1,166	1,759	27,967
Business / Student	1,409	2,748	1,697	2,353	1,194	2,820	909	663	994	1,399	895	1,752	731	19,564
TOTALS	**25,707**	**114,488**	**57,343**	**37,114**	**68,125**	**25,046**	**54,471**	**73,261**	**16,320**	**21,050**	**187,600**	**86,691**	**49,337**	**816,553**

Table 14 – Visitors by Destination in Arkansas by Region and Welcome Center 2014

REGIONAL TOURISM ASSOCIATION (LISTED BY RANK)	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
Heart of Arkansas	1,575	13,352	6,845	4,095	5,872	1,343	4,551	429	204	253	51,206	9,074	7,391	106,190
Diamond Lakes	1,739	5,997	3,221	6,965	3,990	878	2,129	487	1,261	206	33,960	2,751	2,325	65,909
Arkansas Delta Byways	172	17,973	4,398	933	1,167	6,469	4,190	2,147	55	101	19,992	2,509	1,950	62,056
Ozark Gateway	555	140	5,444	968	3,375	467	390	38,809	142	796	2,946	1,062	714	55,808
Northwest Arkansas	11,083	170	370	1,721	9,866	407	1,338	465	1,618	12,243	2,396	11,044	965	53,686
Ozark Mountain Region	719	114	927	1,060	19,115	297	519	2,272	137	1,423	4,438	1,957	448	33,426
Arkansas's Great Southwest	286	6,150	793	682	479	64	125	35	4,232	28	11,185	114	1,373	25,546
Arkansas River Valley Tri-Peaks	1,145	431	679	2,303	2,276	288	805	158	395	148	3,949	4,202	528	17,307
Western Arkansas' Mountain Frontier	2,008	729	147	1,578	1,049	185	458	64	2,261	370	713	5,983	1,260	16,805
Greers Ferry Lake/ Little Red River	129	795	3,602	1,035	2,140	283	449	396	56	47	4,380	1,133	553	14,998
Arkansas' South	109	277	260	7,805	297	109	368	30	184	14	778	275	97	10,603
Arkansas' Land of Legends	234	934	451	1,068	445	315	892	63	32	13	2,576	775	621	8,419
TOTALS	**19,754**	**47,062**	**27,137**	**30,213**	**50,071**	**11,105**	**16,214**	**45,355**	**10,577**	**15,642**	**138,519**	**40,879**	**18,225**	**470,753**

ARKANSAS STATE PARK DESTINATIONS (LISTED BY RANK)	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
Mammoth Spring	18	0	26	16	178	0	1	39,882	2	16	27	0	0	40,166
Crater of Diamonds	484	562	457	1,263	767	62	75	63	310	78	4,763	423	229	9,536
Petit Jean	179	57	88	1,133	486	45	192	41	60	14	1,587	589	48	4,519
DeGray Lake Resort	62	34	48	1,513	42	19	21	12	18	1	1,278	36	25	3,109
Ozark Folk Center	50	8	148	521	761	57	92	210	36	51	826	236	33	3,029
Mount Magazine	330	13	61	90	255	13	73	54	154	24	708	468	8	2,251
Historic Washington	12	0	4	199	32	2	0	2	88	4	1,895	6	0	2,244
Lake Catherine	50	29	20	384	61	12	28	13	19	2	1,116	11	38	1,783
Lake Ouachita	77	46	21	143	36	18	15	4	70	2	977	22	7	1,438
Devil's Den	439	2	4	217	42	2	20	12	53	156	44	294	6	1,291
Mount Nebo	65	5	17	331	329	7	17	13	20	6	343	106	10	1,269
Queen Wilhelmina	19	0	5	830	10	6	1	0	156	16	62	8	0	1,113
Bull Shoals-White River	23	3	30	339	182	23	4	118	10	89	247	19	10	1,097
Moro Bay	0	0	0	751	2	0	3	0	0	0	7	0	2	765
Arkansas Museum of Natural Resources	2	0	0	696	26	1	0	6	4	2	4	2	0	743
Lake Chicot	4	8	2	282	46	13	374	0	2	0	2	7	0	740
Hobbs	307	0	0	132	27	0	0	0	3	217	6	29	0	721
Pinnacle Mountain	13	9	9	336	19	2	6	0	0	22	134	19	6	575
Village Creek	8	89	10	7	7	37	2	22	0	0	221	96	43	542
Lake Dardanelle	39	21	18	17	48	6	6	0	4	0	54	296	15	524
Millwood	17	12	15	8	63	0	2	2	185	0	69	0	7	380
Withrow Springs	45	0	2	196	22	0	0	2	5	17	18	52	4	363
Lake Fort Smith	120	0	0	21	7	2	3	0	12	12	13	131	5	326
South Arkansas Arboretum	0	0	0	326	0	0	0	0	0	0	0	0	0	326
Prairie Grove Battlefield	162	0	0	0	32	1	0	6	23	66	6	22	0	318
Daisy	13	4	6	30	22	1	6	0	114	0	101	6	3	306
Toltec Mounds	4	4	7	187	5	0	5	6	0	5	24	1	0	248
Crowley's Ridge	3	0	35	44	21	8	0	29	0	0	20	13	4	177
Mississippi River	0	1	4	0	33	110	0	0	0	0	7	7	3	165
Cane Creek	1	3	2	75	10	3	14	0	0	0	3	7	0	118
Cossatot River State Park-Natural Area	6	0	0	0	2	0	0	0	87	0	14	0	0	109
Lake Charles	0	0	28	2	12	2	2	47	0	0	3	0	0	96
White Oak Lake	0	0	4	22	0	2	0	0	0	0	59	0	0	87
Jacksonport	0	2	41	0	4	2	0	6	0	0	19	0	0	74
Woolly Hollow	1	0	0	4	30	2	2	0	0	0	24	9	0	72
Davidsonville	4	0	17	0	4	0	0	34	0	0	8	0	3	70
Parkin	0	42	0	4	0	3	2	5	0	0	10	3	0	69
Louisiana Purchase	5	4	1	0	3	34	0	0	0	0	4	2	0	53
Arkansas Post Museum	0	0	0	0	1	14	22	0	0	2	3	0	0	42
Hampson Archeological Museum	0	14	0	4	0	1	0	0	0	0	15	0	1	35
Delta Heritage Trail	0	0	0	0	0	27	0	0	0	0	0	0	0	27
Plantation Agriculture Museum	8	2	5	0	5	0	0	0	0	0	4	2	0	26
Powhatan	4	0	4	0	0	0	0	14	0	0	0	0	0	22
Lake Poinsett	0	4	0	0	2	4	0	0	0	0	2	0	0	12
Lake Frierson	0	0	0	0	2	0	0	4	0	0	5	0	0	11
Jenkins Ferry Battleground	0	0	0	0	4	0	0	0	0	0	4	0	0	8
Lower White River Museum	0	0	0	5	0	0	0	0	0	0	0	2	0	7
Poison Springs Battleground	0	0	0	0	4	0	0	0	0	0	2	0	0	6
Marks' Mills Battleground	2	0	0	0	0	0	0	0	0	0	2	0	0	4
Conway Cemetery	0	0	0	0	0	0	0	0	0	0	2	0	0	2
Herman Davis	0	0	0	0	0	0	0	2	0	0	0	0	0	2
Logoly	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	**2,576**	**978**	**1,139**	**10,128**	**3,644**	**541**	**988**	**40,609**	**1,435**	**802**	**14,742**	**2,924**	**510**	**81,016**

Table 16 – Visitors by State and Welcome Center 2014

STATES (LISTED BY RANK)	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
ARKANSAS	4,772	4,597	19,875	9,874	25,219	12,270	23,519	21,527	6,713	2,931	21,398	10,123	6,506	169,324
TEXAS	1,484	9,773	4,525	2,308	4,685	943	829	1,805	3,129	1,418	99,711	15,223	7,136	152,969
MISSOURI	7,271	23,367	14,149	523	12,434	289	1,262	27,859	595	459	3,662	1,033	1,656	94,559
OKLAHOMA	1,246	318	155	448	2,539	531	1,750	581	627	13,516	718	26,960	1,479	50,868
LOUISIANA	579	3,317	569	18,986	2,915	229	5,822	1,034	3,449	88	9,300	474	802	47,564
ILLINOIS	559	24,460	8,640	249	1,584	180	202	1,502	67	142	6,185	471	1,172	45,413
MISSISSIPPI	256	4,957	168	1,601	1,776	5,542	13,027	3,120	122	31	1,218	1,160	1,928	34,906
TENNESSEE	169	5,356	417	229	1,272	1,333	393	3,452	40	101	7,488	3,503	6,430	30,183
INDIANA	171	7,664	1,715	113	589	70	60	422	18	60	4,010	343	419	15,654
MICHIGAN	256	6,143	1,219	141	656	108	135	434	53	74	4,668	532	759	15,178
FLORIDA	438	1,713	268	325	1,362	335	2,447	1,372	150	92	1,271	1,954	1,488	13,215
ALABAMA	130	1,235	101	458	1,043	602	1,409	1,622	42	33	901	1,930	1,947	11,453
KANSAS	2,395	468	102	172	1,473	163	565	2,530	143	427	206	1,771	324	10,739
OHIO	186	1,660	591	238	358	104	96	232	31	50	4,612	592	1,491	10,241
WISCONSIN	409	4,164	1,674	72	857	87	172	482	62	84	1,626	232	312	10,233
KENTUCKY	77	3,464	606	114	205	85	52	347	17	36	3,210	548	1,126	9,887
IOWA	1,231	2,604	522	57	1,566	93	177	636	199	73	494	263	227	8,142
CALIFORNIA	185	542	194	40	683	148	216	459	51	254	1,113	3,315	797	7,997
GEORGIA	158	498	121	287	752	484	321	637	40	42	673	1,992	1,725	7,730
MINNESOTA	1,229	1,713	187	76	1,305	76	235	410	249	74	506	278	399	6,737
NORTH CAROLINA	88	328	87	68	451	170	93	137	22	57	1,284	1,884	1,653	6,322
VIRGINIA	63	187	98	19	215	65	77	164	10	54	1,558	1,092	1,481	5,083
PENNSYLVANIA	72	381	85	23	202	108	54	95	14	40	1,755	680	1,009	4,518
ARIZONA	142	324	90	46	279	38	62	169	17	100	871	1,714	418	4,270
COLORADO	186	228	57	35	424	80	241	250	18	172	244	1,429	250	3,614
NEW YORK	81	311	107	23	186	62	48	61	8	36	1,220	460	834	3,437
SOUTH CAROLINA	46	176	38	87	205	146	98	137	9	24	376	816	723	2,881
NEBRASKA	705	362	35	7	643	6	136	349	133	58	101	172	82	2,789
NEW MEXICO	47	134	40	69	136	34	24	53	10	75	369	1,064	241	2,296
WASHINGTON	92	213	71	45	265	43	67	182	25	64	210	388	196	1,861
MARYLAND	29	67	32	7	65	31	28	33	6	15	517	312	550	1,692
NEW JERSEY	26	87	28	12	64	21	17	37	2	18	396	258	370	1,336
WEST VIRGINIA	14	152	64	29	70	20	15	30	8	7	495	183	212	1,299
SOUTH DAKOTA	237	181	29	27	149	17	49	87	63	8	92	75	39	1,053
MASSACHUSETTS	40	86	35	18	43	24	26	11	2	36	269	211	249	1,050
OREGON	46	90	41	12	120	24	78	64	39	25	140	215	134	1,028
NEVADA	40	84	32	8	64	9	31	37	5	5	114	433	106	968
UTAH	8	46	12	9	42	14	26	68	11	17	55	206	69	583
CONNECTICUT	9	41	19	6	39	16	18	18	3	17	171	109	115	581
IDAHO	31	49	27	2	78	8	17	42	6	12	80	109	46	507
NORTH DAKOTA	79	104	6	8	87	8	18	49	8	13	51	43	19	493
ALASKA	33	51	24	9	67	19	13	42	5	3	85	67	39	457

Table 16 – Visitors by State and Welcome Center 2014 (continued)

STATES (LISTED BY RANK)	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
WYOMING	26	55	4	2	56	1	35	70	6	27	34	114	18	448
MAINE	4	23	10	1	28	6	22	14	1	13	138	107	75	442
NEW HAMPSHIRE	12	29	6	5	58	7	1	10	7	13	80	99	100	427
MONTANA	38	61	19	4	40	10	23	60	10	7	23	62	27	384
VERMONT	10	26	14	1	35	11	1	8	0	9	87	61	94	357
DELAWARE	2	13	3	0	13	6	3	11	2	0	110	85	87	335
DISTRICT OF COLUMBIA	0	18	2	0	8	2	10	1	0	1	47	63	157	309
HAWAII	7	18	31	3	29	0	9	12	0	2	38	47	21	217
RHODE ISLAND	5	7	1	0	12	1	20	1	4	2	48	33	27	161
TOTALS	**25,419**	**111,945**	**56,945**	**36,896**	**67,446**	**24,679**	**54,049**	**72,765**	**16,251**	**20,915**	**184,028**	**85,288**	**47,564**	**804,190**

FOREIGN COUNTRIES	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
AFRICA														
AFRICA OTHER	4	6	5	36	10	0	2	15	6	3	23	10	31	151
EGYPT	0	0	0	0	0	2	0	3	0	0	0	5	0	10
AMERICAN POSSESSIONS & TERRITORIES														
GUAM	0	1	0	0	0	0	0	0	0	0	11	5	0	17
PHILIPPINES	3	11	0	0	0	0	2	0	0	0	0	3	13	32
PUERTO RICO	6	8	4	0	5	0	3	3	0	0	6	3	15	53
VIRGIN ISLANDS	0	6	0	0	0	0	4	0	0	0	2	3	7	22
ASIA														
ASIA OTHER	0	5	0	0	1	5	1	0	0	0	13	4	0	29
CHINA	3	7	5	0	7	0	8	3	3	0	20	32	14	102
INDIA	3	0	0	9	9	0	6	4	2	6	20	10	2	71
INDONESIA	0	0	0	0	4	0	0	0	0	0	0	2	0	6
JAPAN	2	13	0	18	2	9	16	13	0	0	12	24	14	123
KOREA	0	4	0	0	3	0	2	7	0	0	13	29	25	83
MALAYSIA	0	5	0	0	4	0	0	0	0	3	0	2	0	14
PAKISTAN	0	3	0	0	0	0	0	0	0	0	0	0	0	3
SRI LANKA	0	7	0	0	2	0	0	0	0	0	0	0	0	9
THAILAND	5	2	0	0	0	0	2	8	0	0	10	10	3	40
TURKEY	0	3	0	0	0	0	0	0	0	0	6	0	3	12
CANADIAN PROVINCES														
ALBERTA	17	85	3	2	44	9	21	0	6	4	33	44	2	270
BRITISH COLUMBIA	8	9	4	0	30	11	17	0	4	3	51	67	41	245
CANADA OTHER	0	15	0	51	4	4	0	96	0	21	6	0	0	197
MANITOBA	50	82	11	2	75	4	12	4	2	0	34	18	2	296
NEW BRUNSWICK	0	19	2	2	12	0	2	2	2	0	23	15	39	118
NEWFOUNDLAND	0	2	3	0	0	0	0	0	0	0	9	3	0	17
NOVA SCOTIA	0	3	4	0	5	0	2	0	0	0	39	22	6	81
ONTARIO	65	1,294	217	11	138	22	25	14	6	10	1,667	288	700	4,457
PRINCE EDWARD ISLAND	0	5	0	1	4	0	1	0	0	0	6	4	0	21
QUEBEC	4	123	19	0	0	4	5	0	0	2	297	173	86	713
SASKATCHEWAN	7	17	3	1	35	4	12	0	2	0	10	10	0	101

FOREIGN COUNTRIES	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
CENTRAL AMERICA														
BAHAMAS	0	0	0	0	0	0	0	16	0	0	0	0	0	16
BELIZE	0	11	0	0	0	0	2	0	0	0	3	0	22	38
BERMUDA	0	6	0	0	0	0	0	0	0	0	0	0	8	14
CENTRAL AMERICA OTHER	0	0	0	0	0	0	0	4	0	0	6	1	0	11
COSTA RICA	0	7	0	0	0	3	2	3	0	0	0	3	0	18
CUBA	0	0	0	0	0	0	0	6	0	0	0	4	0	10
GUATEMALA	0	12	0	0	4	0	2	0	0	6	0	8	0	32
HONDURAS	0	5	0	0	0	0	0	0	0	0	1	5	0	11
JAMAICA	0	4	0	0	0	0	0	0	0	0	4	0	0	8
PANAMA	0	0	0	0	0	0	0	0	2	0	2	5	0	9
EUROPE														
AUSTRIA	0	13	2	0	14	6	16	0	0	0	27	28	111	217
BELGIUM	0	3	0	0	5	0	3	0	5	3	0	2	0	21
BULGARIA	0	0	1	0	5	0	0	0	0	0	1	0	0	7
CZECH REPUBLIC	4	0	0	0	0	0	0	0	2	0	2	9	2	19
DENMARK	3	9	19	0	3	3	0	17	0	1	17	17	33	122
ENGLAND	8	92	5	4	32	69	31	48	2	1	140	76	69	577
EUROPE OTHER	0	20	0	0	0	0	1	14	0	0	40	6	6	87
FINLAND	2	13	0	0	12	7	6	0	0	0	10	9	14	73
FRANCE	12	10	2	6	14	16	24	16	0	4	21	36	26	187
GERMANY	32	100	17	38	105	73	58	78	13	33	104	85	215	951
HUNGARY	0	0	4	0	0	0	0	3	0	0	3	6	6	22
ICELAND	0	0	0	0	0	0	0	0	0	0	0	12	0	12
IRELAND	1	16	2	0	2	0	0	4	0	0	31	12	4	72
ITALY	0	23	0	2	4	11	12	4	0	2	30	7	10	105
NETHERLANDS	3	20	2	0	14	10	17	4	4	2	56	30	29	191
NORWAY	14	7	2	2	0	10	0	6	0	0	3	11	12	67
POLAND	0	9	0	0	4	2	2	0	0	0	5	8	2	32
PORTUGAL	0	0	0	0	0	0	0	0	0	0	1	0	4	5
RUSSIA	2	1	3	0	0	0	2	4	1	0	14	23	2	52
SCOTLAND	2	14	5	0	8	4	2	0	0	0	13	2	11	61
SPAIN	0	18	0	0	3	5	4	0	0	0	13	16	9	68
SWEDEN	0	9	0	18	0	10	17	1	1	0	25	13	45	139
SWITZERLAND	2	18	4	0	6	4	13	5	2	4	37	17	29	141
WALES	0	2	0	0	0	0	0	0	0	0	0	2	2	6
YUGOSLAVIA	0	0	1	0	0	0	0	0	0	0	1	0	0	2

FOREIGN COUNTRIES	BENTON-VILLE	BLYTHE-VILLE	CORNING	EL DORADO	HARRISON	HELENA-W. HELENA	LAKE VILLAGE	MAMMOTH SPRING	RED RIVER	SILOAM SPRINGS	TEXAR-KANA	VAN BUREN/ FORT SMITH	WEST MEMPHIS	TOTALS
MEXICO														
MEXICO	2	282	39	10	10	3	10	13	0	2	528	35	61	995
NEAR & MIDDLE EAST														
IRAN	2	0	0	0	0	0	0	0	0	0	0	0	3	5
ISRAEL	2	4	0	0	2	9	4	2	0	0	0	0	2	25
NEAR & MIDDLE EAST OTHER	0	0	0	1	1	0	0	0	0	0	0	1	0	3
SAUDI ARABIA	0	3	0	0	0	2	0	3	0	0	0	4	0	12
OCEANIA														
AUSTRALIA	11	62	6	4	18	35	34	37	3	16	85	65	0	376
NEW ZEALAND	3	6	2	0	4	11	4	13	2	0	13	13	8	79
SOUTH AMERICA														
ARGENTINA	2	0	0	0	2	0	0	0	0	0	2	4	4	14
BOLIVIA	0	0	0	0	0	0	0	3	0	0	1	0	0	4
BRAZIL	5	16	0	0	6	2	4	2	0	2	10	17	10	74
CHILE	0	0	0	0	3	0	8	0	0	5	1	0	0	17
PERU	0	0	2	0	2	0	0	0	0	2	0	4	2	12
SOUTH AMERICA OTHER	0	0	0	0	2	1	5	6	5	6	8	10	7	50
VENEZUELA	0	0	0	0	0	0	0	0	0	0	0	0	1	1
TOTALS	**289**	**2,550**	**398**	**218**	**679**	**370**	**426**	**484**	**75**	**141**	**3,569**	**1,392**	**1,772**	**12,363**

Attachment 3

American Bird Conservancy: Hundreds of thousands of birds could be collateral damage of bigger wind turbines

BY MICHAEL PARR | Posted: Saturday, May 30, 2015 12:15 am

When the Department of Energy released a report last week championing the construction of larger, more-powerful wind turbines, the wind industry unsurprisingly greeted the news with enthusiasm.

By extending the "hub-height" of turbines up to 360 feet, the chief executive of the American Wind Energy Association said, wind energy could expand to all 50 states.

Wind turbine

Industrial wind turbines spin on the Oklahoma plain. The U.S. Department of Energy is championing larger turbines. JOHN CLANTON/Tulsa World

Less ardent was the association's response to well-documented concerns over the half-million birds that die each year from collisions with existing turbines: Some migrating birds, a spokesman said, fly too high to be harmed by rotor blades.

Indeed. Some birds do fly very high in the sky. But far more travel at the very altitudes that would put them at greatest risk of colliding with these taller turbines. The risk is especially high during spring and fall, when migrating birds take to the skies in billions, many traveling vast distances between their wintering and breeding grounds.

A new report this month from the U.S. Fish and Wildlife Service calls into question the wind industry's assertion that birds fly well above wind turbines' rotor blades. Using radar, researchers examined fall migration at two locations in Michigan. They found that the greatest density of birds and bats migrating at night occurred from 300 to 500 feet above ground. That's almost directly at hub-height for the new generation of giant turbines.

Birds and bats "don't have fixed lanes up there in the sky," says Jeff Gosse, regional energy coordinator for the U.S. Fish and Wildlife Service in Bloomington, Minn., and the report's principal investigator. For instance, during poor weather, birds tend to fly lower. "As conditions change, they will change their altitude, also. As the report indicates, many birds and bats are flying within the current rotor swept zone."

Before we rush to build thousands of turbines taller than many skyscrapers, with blade tips that often

spin in excess of 100 mph, we should pause to examine what we already know about turbines' impacts on wildlife. Concerns about birds — and bats, which turbines also kill in large numbers — have not gone unnoticed. (The Department of Energy report euphemistically acknowledges the need to address "additional interactions with wildlife.")

Yet we already know what these "interactions" are. While existing wind turbines kill hundreds of thousands of birds annually, the projections are even more sobering: scientists have estimated that as the number of turbines increases, they could kill more than a million birds each year by 2030.

Meanwhile, a new analysis released last week by American Bird Conservancy based on federal data found that more than 30,000 turbines have been installed in areas critical to the survival of federally protected birds — with an additional 50,000 turbines planned for construction in similar areas.

But there are steps we can take. Building wind turbines away from heavily traveled bird migration routes such as the Atlantic coastline or in the Great Lakes region would help to lessen the fatal collisions. So would temporary shutdowns of turbines during peak migration periods in the spring and fall.

Keeping turbines away from core habitat where imperiled birds breed is also important. Another new study shows that Greater Prairie-Chickens — rare birds that gather each year for mating displays — are more likely to abandon these courtship grounds when they are close to wind turbines.

These are all realistic goals. The Federal Aviation Administration, for instance, already uses a database to make sure wind farms aren't built in places where they would interfere with aircraft. The U.S. Fish and Wildlife Service is well-equipped to do for birds and other wildlife what the FAA does for planes. The agency's biologists know where birds occur, how they migrate, and which areas harbor protected species such as the California Condor and Whooping Crane.

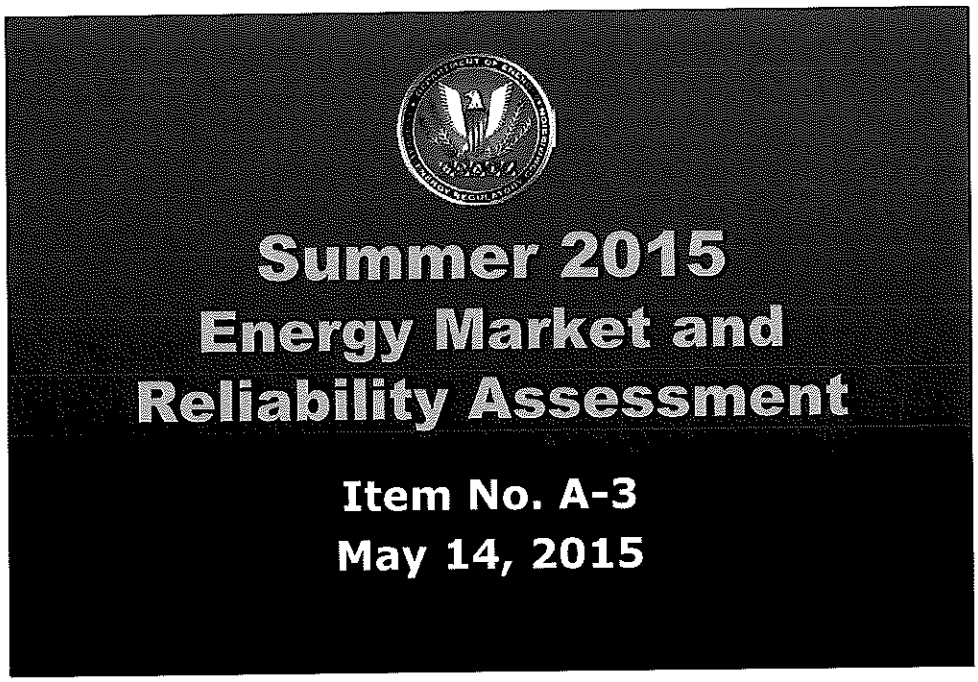
Developing renewable energy sources is important. But right now, our policies treat birds and other wildlife as collateral damage in that quest. As the wind industry prepares to take turbines to new heights, the death toll for birds will only intensify.

Science tells us our current approach to wind development is killing hundreds of thousands of birds each year. The good news is that we also have the tools to do better.

Michael Parr is vice president and chief conservation officer for the American Bird Conservancy.

Attachment 4

Slide 1

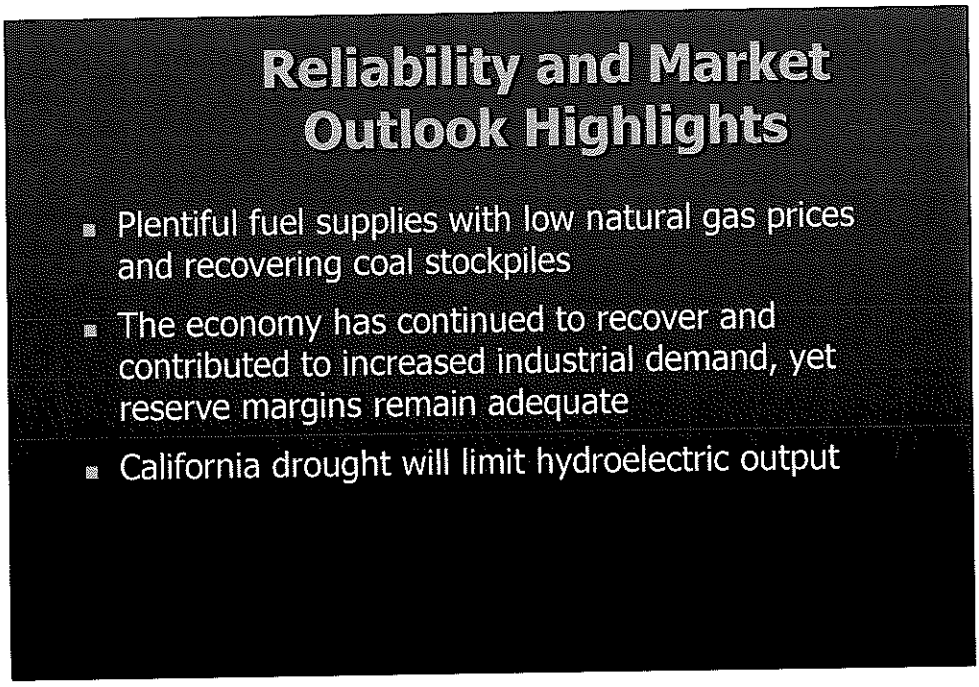


Good morning Mr. Chairman and Commissioners.

The Office of Electric Reliability and the Office of Enforcement are pleased to present the 2015 Summer Seasonal Assessment. This is staff's annual opportunity to share our summer outlook on the electricity and natural gas markets and reliability matters to better inform the Commission's understanding of current and future trends.

Please note that some information in this presentation comes from NERC's 2015 Summer Reliability Assessment which will be considered for approval by the Board of Trustees this afternoon and still is subject to change.

Slide 2



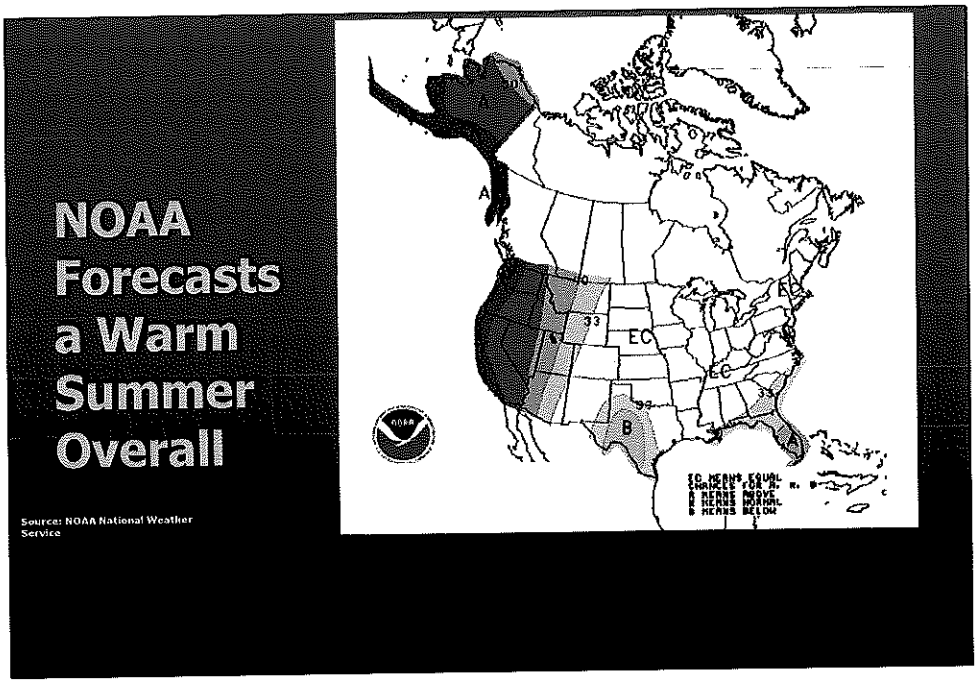
These bullets reflect the key takeaways from today's presentation.

Market conditions going into the summer will reflect the continued low natural gas prices that have resulted from robust production, as well as the recovery of fuel stockpiles at coal-fired power plants.

Regional electric system reserve margins are adequate, despite modest growth in load, which is primarily attributable to increased industrial activity.

The historic drought in California and the West has entered its fourth year and is an area of particular concern. This may lead to elevated energy prices; however, both the NERC and the California ISO have concluded that the current situation is not a threat to reliability.

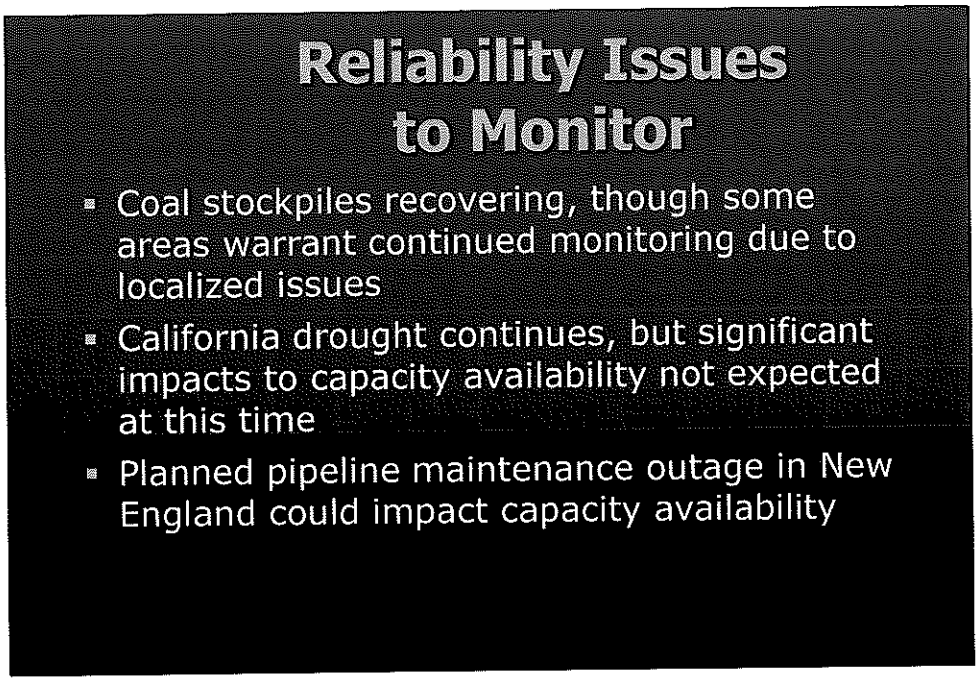
Slide 3



Weather conditions are among the most important, yet difficult to predict, factors affecting the energy markets. NOAA is forecasting potentially warmer than normal temperatures across the West and the Southeast, with the greatest likelihood along the West Coast. Below normal temperatures are forecasted for portions of Texas and eastern New Mexico.

Citing the likely development of a moderate to strong El Niño pattern, forecasters are predicting a below average hurricane season for the Atlantic basin, with only three hurricanes forecasted. By comparison, seven hurricanes is considered normal for a season. Generally speaking, hurricanes do not have the same level of impact on the US energy markets as they did several years ago, due to the substantial shift in natural gas production from the Gulf of Mexico to onshore shale production.

Slide 4

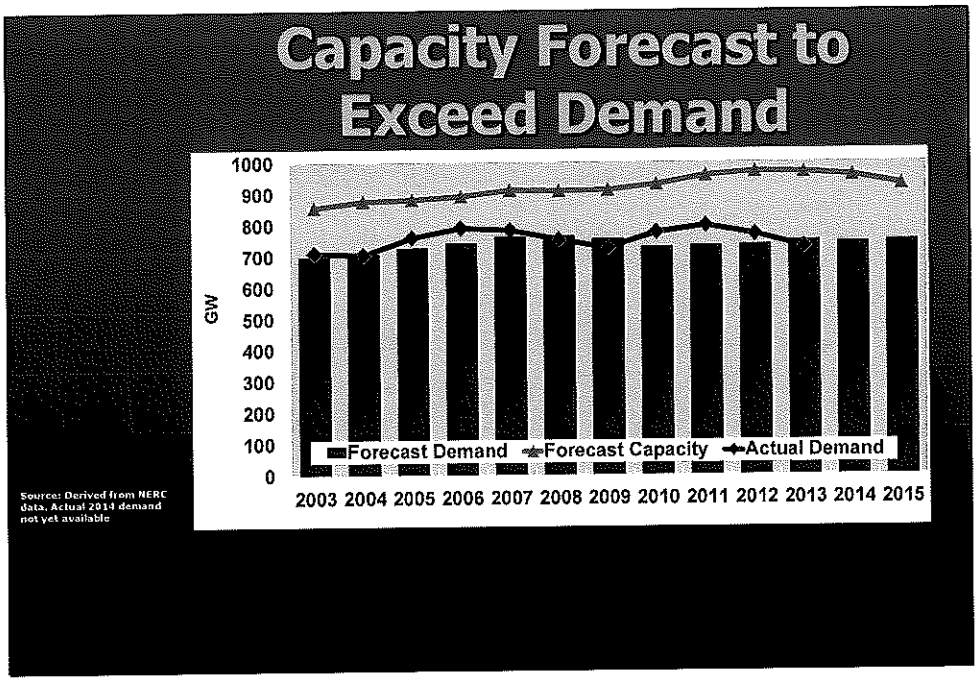


The Energy Information Administration reported that power plant coal stockpiles have been recovering since summer 2014; however, the forecasted stockpile levels are expected to remain modest throughout 2015. In some regions, localized issues have resulted in limited rebuilding of these stockpiles. If natural gas prices were to rise during the summer, increased coal-fired generator output may result in coal supply issues to reemerge in the Midwest.

The ongoing drought conditions in California and the West will limit the availability of hydroelectric generation over the summer. We will discuss the drought in greater detail later in this presentation.

In late August, ISO-NE may experience some impacts to the region's natural gas-fired generating fleet when Spectra Energy begins maintenance and expansion of the Algonquin pipeline.

Slide 5



EIA has forecast a 2.9 percent increase in electric demand from 2014, reflecting an expected return to more typical conditions from last year's unusually mild weather. This compares to a weather adjusted increase of approximately 1 percent over last year's forecast. This growth is driven primarily by the commercial and industrial sectors, as opposed to the residential sector, which is a reversal from the past few years.

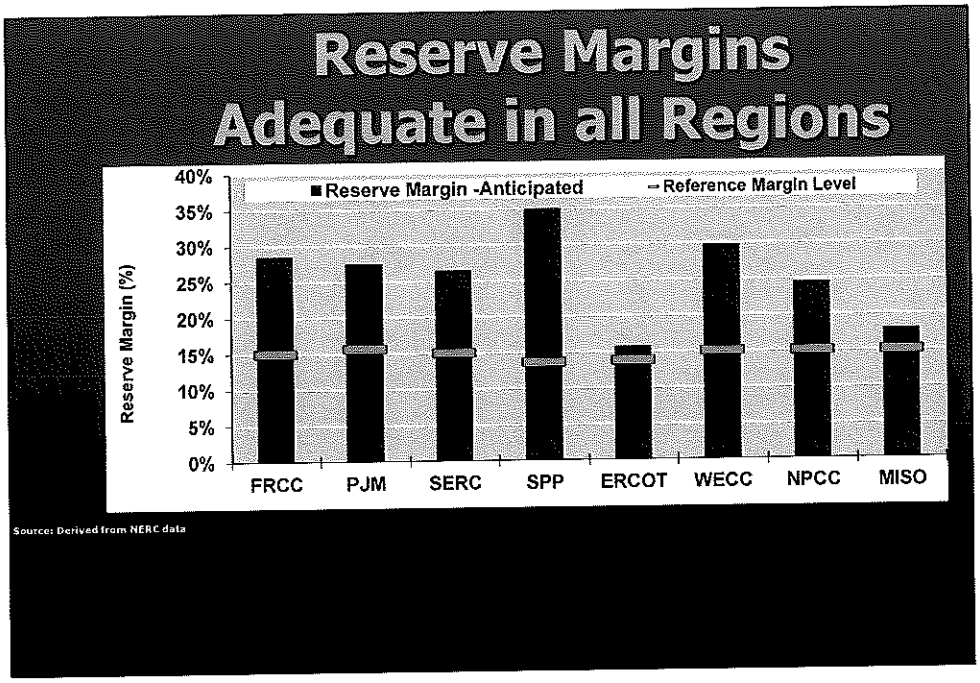
The historic correlation between economic growth and increased electrical demand has weakened in many markets. A recent report by the NYISO attributed this declining linkage to a combination of factors, including the expansion of energy efficiency programs and growing impact of behind-the-meter generation, which includes residential solar. If continued, this shift may further complicate the forecasting of energy demand, based on economic growth.

Meanwhile, the total generating capacity in the U.S. has decreased by about 3 percent, primarily because of increased coal generator retirements. This is a continuation of the trend that was seen last year. In contrast to coal, NERC forecasts an increase of approximately 3.5 GW in wind generation capacity over last year, or approximately 6 percent and brings the national wind total to approximately 65 GW. NERC is also projecting a net increase of approximately 2 GW of installed utility-scale

solar capacity for this summer, though more solar generation is planned to come online this summer.

One notable transmission project is the rebuilding of the 500 kV Susquehanna-Roseland power line, which runs between Pennsylvania and New Jersey. It was placed into service on May 11th and is expected to lower congestion and increase market efficiency in this region of PJM.

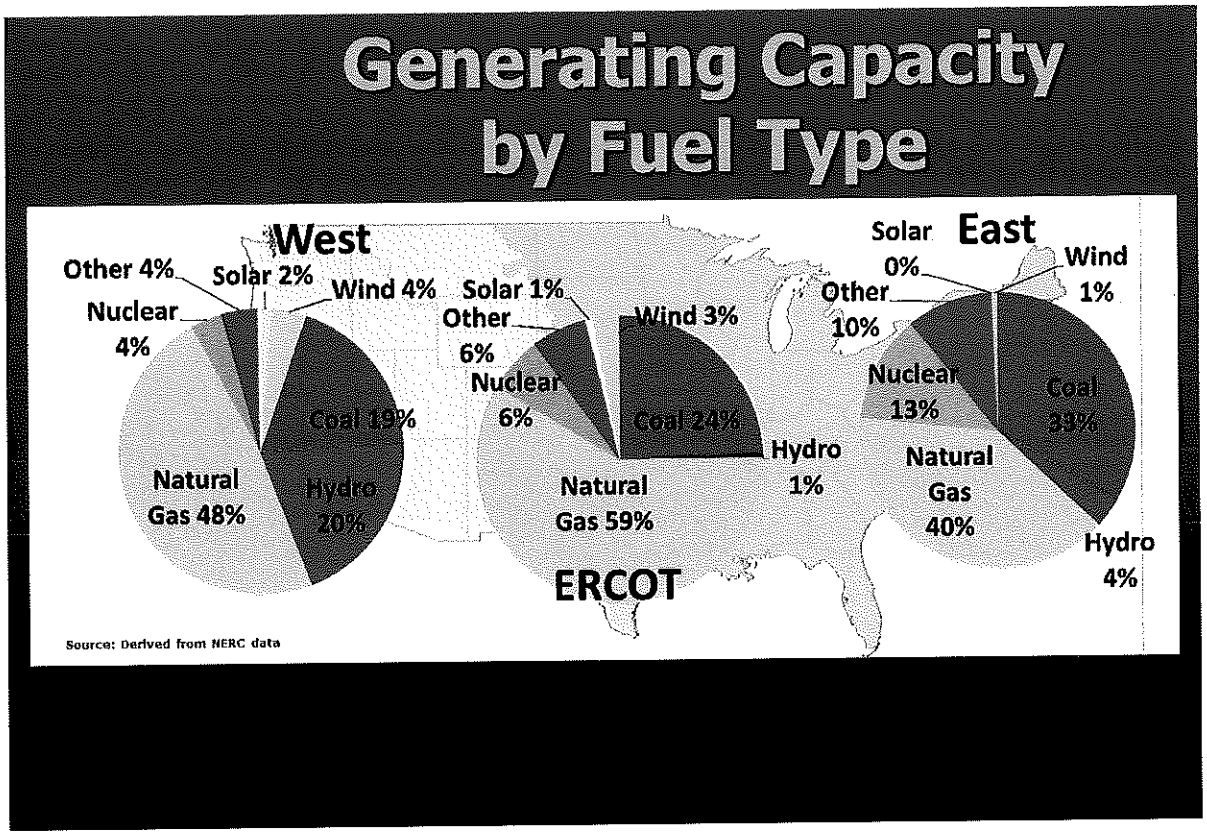
Slide 6



Data from NERC's Summer Assessment indicates that reserve margins will be adequate for all assessment areas this summer. This chart displays the reference reserve margin levels for various markets and regions, along with the anticipated reserve margins.

Resource adequacy is forecast to improve this summer in MISO, ERCOT and New York. In ERCOT, a new load forecasting methodology that has resulted in higher available wind capacity, coupled with new natural gas-fired capacity, have increased the reserve marginfrom 15 to 15.6 percent. In New York, margins have also improved because of repowered generation capacity and lower forecast demand.

Slide 7

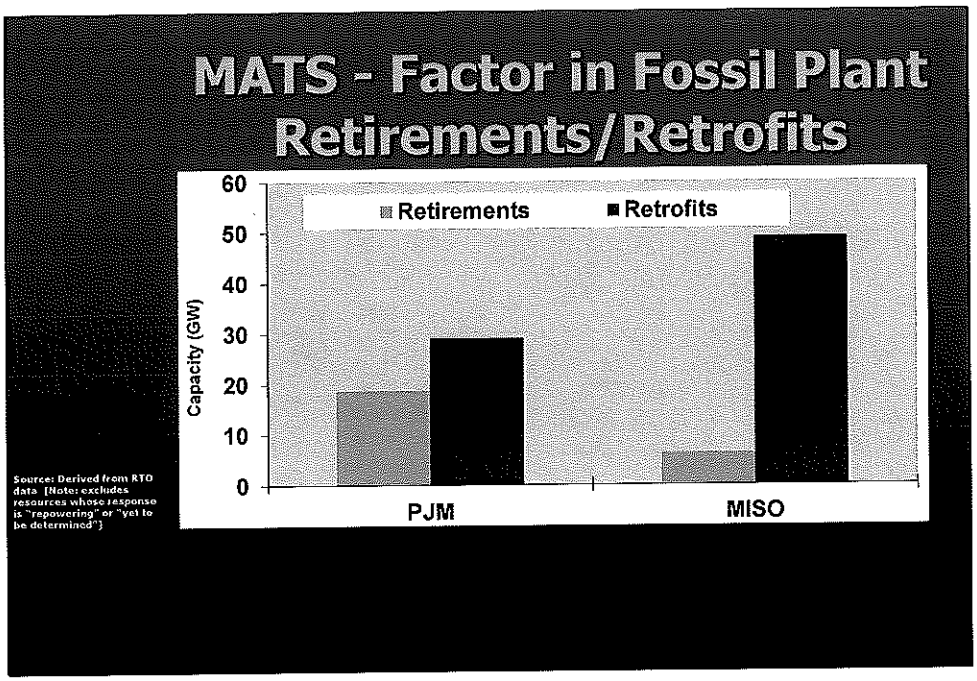


The available generator capacity in WECC has increased by approximately 5 GW since last summer, with approximately 6 GW of additions and 1GW of retirements. These additions include over 2 GW of solar and approximately 1 GW of wind resources.

In ERCOT, approximately 2 GW of natural gas and 2 GW of wind capacity have entered commercial service since the last summer assessment. This includes the Panda Temple 2 natural gas combined cycle project and the Goldsmith peaker project with a combined summer capacity of approximately 1 GW.

Notably, in the Eastern Interconnection, the 615 MW Vermont Yankee Nuclear Power Plant retired in late December 2014. This brings the total to five nuclear power plants that have been decommissioned since 2012. While the loss of Vermont Yankee leaves New England even more dependent upon natural gas, 178 MW of new energy efficiency projects are expected to be in place this summer. Despite the loss of Vermont Yankee, the grid operator forecasts adequate resources to meet demand.

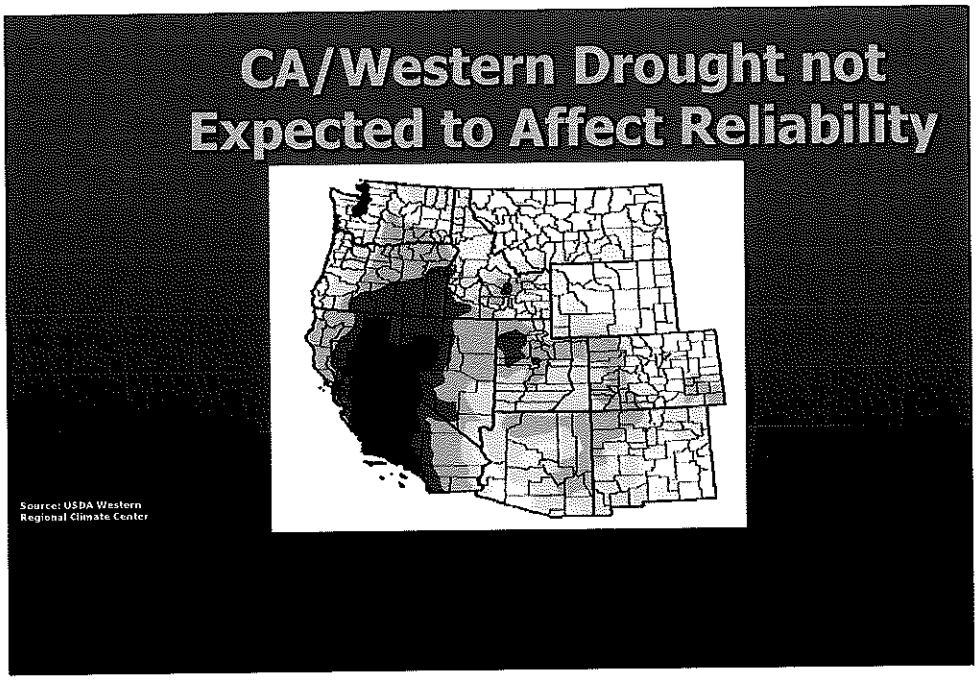
Slide 8



The Mercury and Air Toxics Standards (MATS) rules took effect in April and require advanced pollution controls on coal and oil-fired units larger than 25 MW. This has caused units in MISO and PJM to make capital-intensive pollution control retrofits to comply with the rule, as illustrated in this chart. While SPP has not published statistics that are similar to these regions, a recent Boston Pacific report, commissioned by the SPP Board of Directors, indicated that 1.1 GW of generation was expected to be retired as a result of EPA regulations.

Adding pollution controls increases the non-fuel operating and maintenance costs of coal plants, but provides added flexibility to burn lower-cost, higher sulfur coal. Many plants have elected to install pollution controls with comparatively lower capital costs and higher variable O&M costs. This can increase total plant operating costs by up to one-third, which is typically reflected in higher energy market offers or directly incorporated in the retail rates of vertically integrated utilities. In a low natural gas price and load growth environment, the MATS related costs were uneconomic for many older and less efficient coal plants and many of these units were retired. The closures have exceeded conventional generation replacements and may result in lower reserve margins and increased transmission congestion in the near-term, as well as a greater dependence upon natural gas for generation.

Slide 9



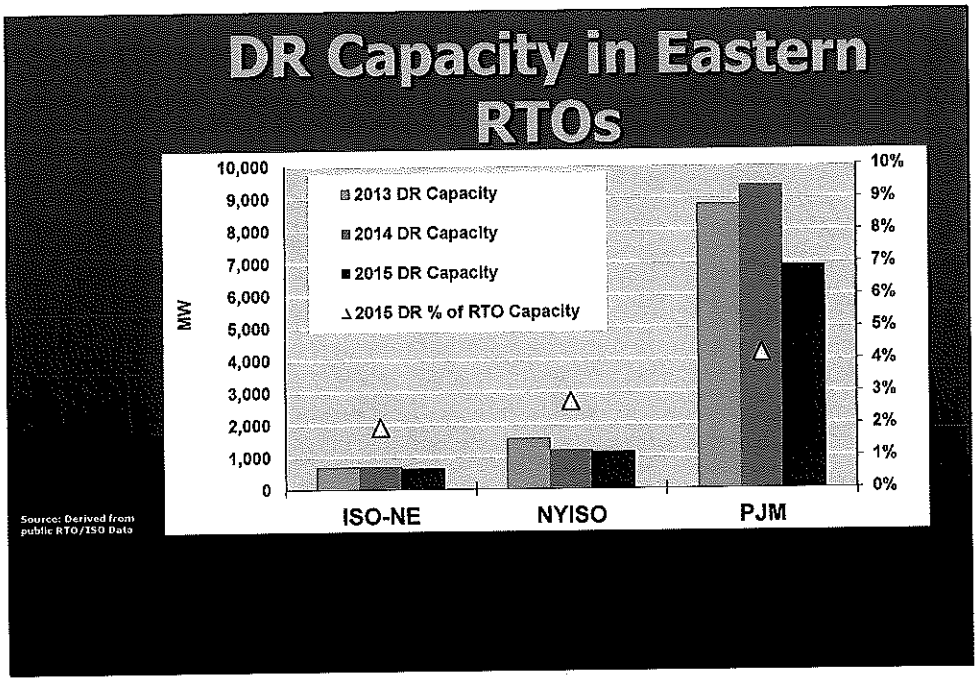
Below average precipitation and warmer than normal temperatures left the West with extremely low snowpack levels on April 1, the day at which snowpack traditionally peaks. California's snowpack fell to a record 5 percent of normal on April 1, reaching historical lows for the second year in a row. However, reservoir levels in the state rose over last year's levels because of early snow melt and rain.

CAISO expects that the reduced hydro generation will be offset by moderate load growth and 2.1 GW of new generation, of which 2 GW is solar. Solar generation now exceeds 6 GW at its peak output. Additionally, new transmission upgrades in the San Diego and Orange County areas will improve local resource adequacy. Staff will be monitoring the load area around Fresno, which is typically served by significant amounts of hydro generation. If the drought persists, power will need to be brought in from other areas and could potentially result in increased transmission congestion and elevated local power prices.

Snow pack was also below normal throughout the remainder of the West. For example, in Washington, precipitation was near normal, at 101 percent of typical, but warm temperatures kept snowpack from accumulating and was only 22 percent of normal on April 1.

Lastly, these conditions may create challenges during California's fire season, as there may be a dramatically increased risk of wildfire activity, which has the potential to affect power grid operations. Lastly, these conditions may create challenges during California's fire season, as there may be a dramatically increased risk of wildfire activity, which has the potential to affect power grid operations.

Slide 10



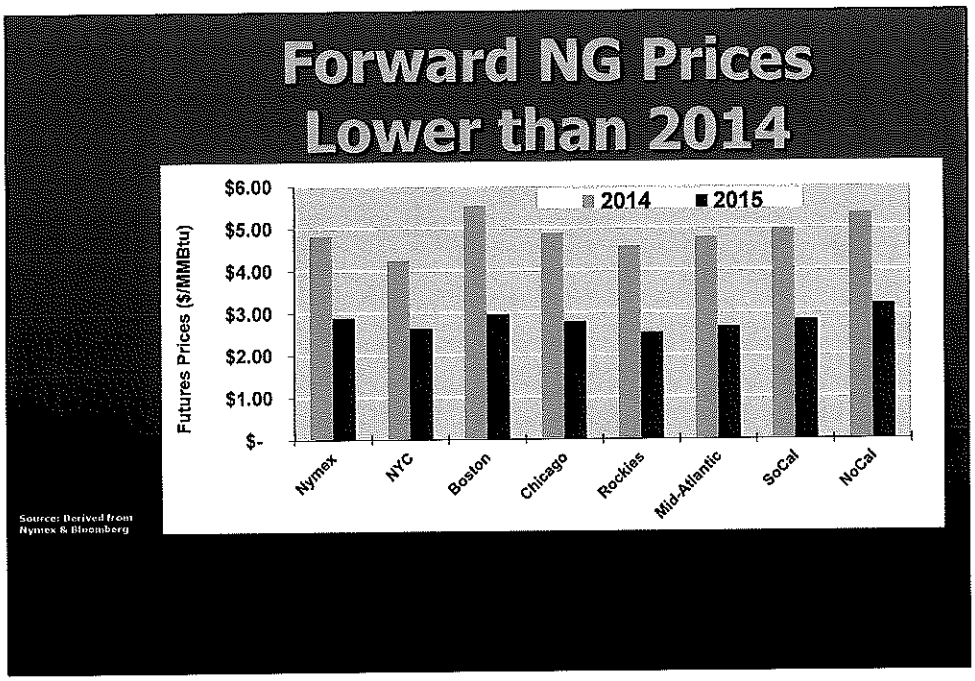
Demand response has traditionally been a summer resource to shave peaks on hot days or during other periods of stress. This chart shows participation in the capacity-based demand response (DR) programs in the three Northeastern RTOs. The colored bars indicate the actual amounts of enrolled demand response capacity, which have fallen in each of the regions from last year. This has occurred most notably in PJM, which has the largest of these programs, dropping by nearly 2,500 MW. Additionally, the current 6,900 MW of participation is less than half of the original 14,800 MW of DR that cleared in the forward capacity auction that was held in 2012, for the 2015/16 capability period. This reduction occurred when a substantial number of market participants traded away these positions in the RTO's capacity reconfiguration auctions and through other transactions.

In the NYISO and ISO-NE, the reductions were much more modest than in PJM, in terms of both megawatts and percentage of cleared capacity. In the case of New York, the amount of DR fell by 65 MW or 5 percent, and in New England it was 62 MW or 9 percent.

Last summer, there were no activations of the capacity based DR programs in these regions, primarily because of the mild weather and moderate system conditions.

However, if above normal temperatures occur this summer, we could expect to see demand response resources activated and dispatched in the real-time energy markets.

Slide 11

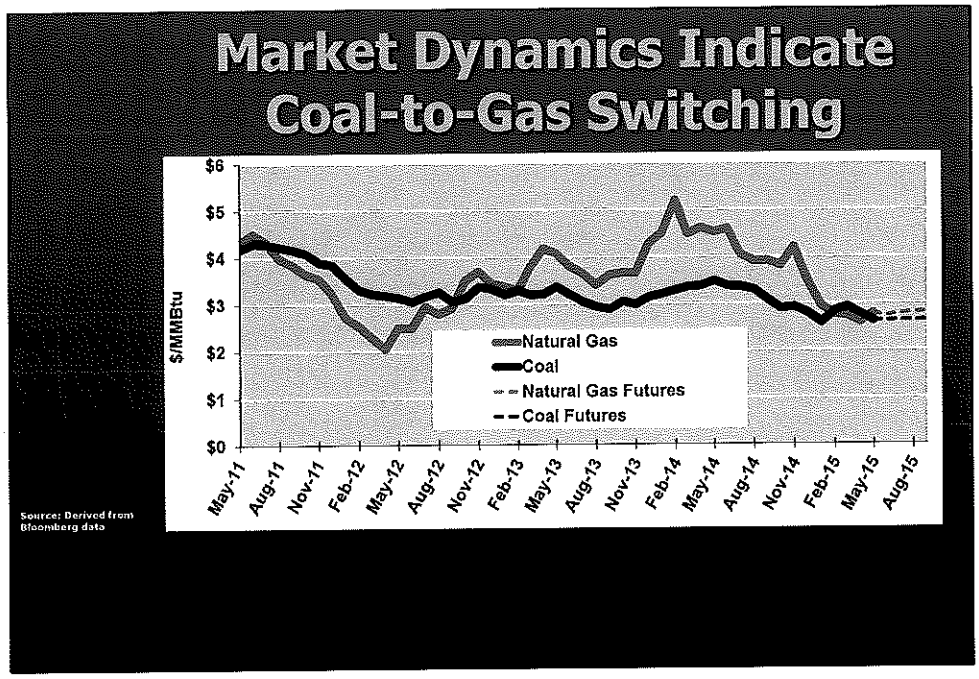


Forward prices are not a predictor of actual prices, but reflect the cost of hedging market risk and can help us understand market dynamics.

Going into the summer, the average Nymex futures price for June through August is $2.89/MMBtu, which is 40 percent lower than in 2014. This is consistent across the country, with the Boston area's Algonquin Citygate showing the largest differential, at 46 percent below last year, and averaging $2.96/MMBtu for the summer. This can be attributed to a 5.7 percent year-on-year increase in natural gas production and storage inventories that are 71 percent higher than in 2014, or 4 percent below the 5-year average.

The injection season began on April 3 with 1.5 Tcf of natural gas in storage, 79 percent above last year. Since then, weekly injections have averaged 65 Bcf, versus 47 Bcf last year. If injections continue at this rate, inventories could set a new record by the end of the injection season on October 31.

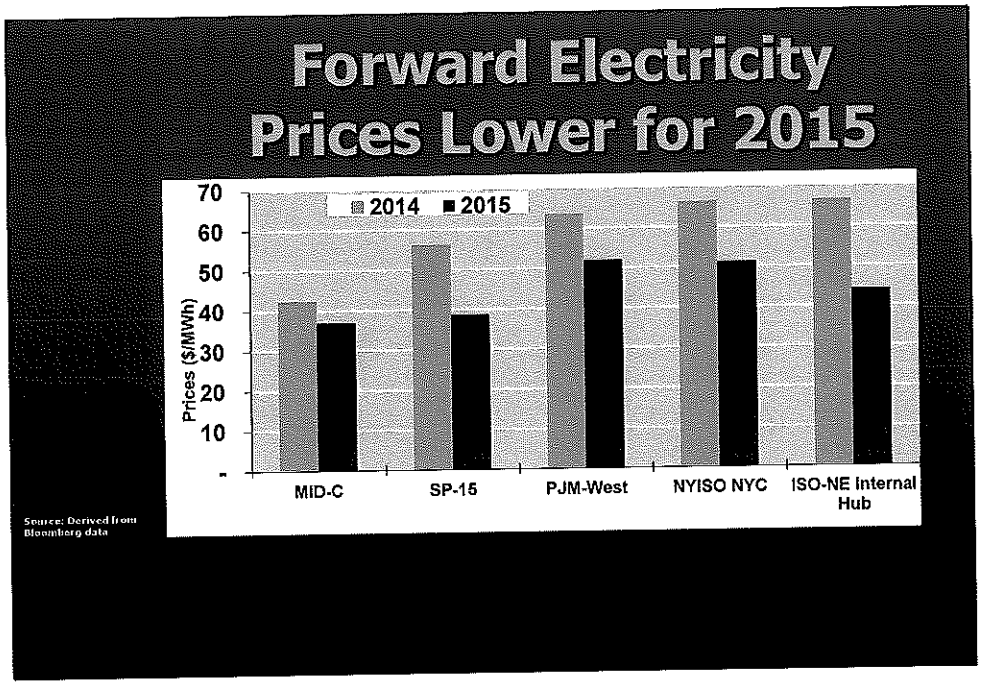
Slide 12



With summer futures prices below $3.00/MMBtu in most regions, natural gas is expected to be competitive with coal on a $/MMBtu basis, when adjusted for the relative efficiency of natural gas versus coal-fired electric generation units. The only region where summer futures are above $3.00/MMBtu is Northern California; however, since the region has no coal-fired plants, it will not experience any coal-to-gas switching.

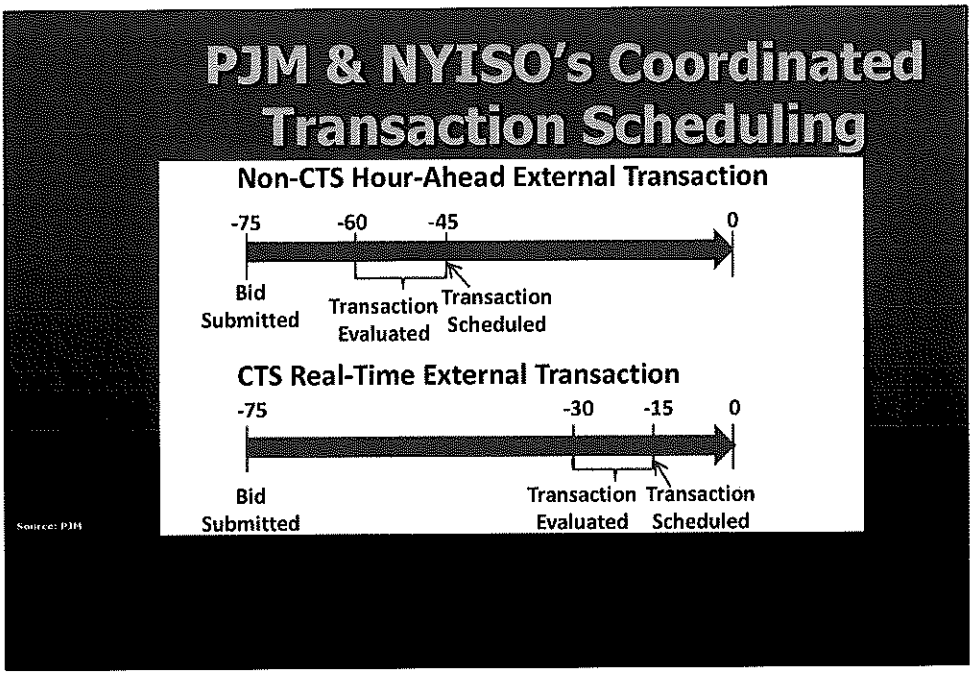
Any further downward price pressure would give natural gas an even greater advantage in the supply stack and is comparable to 2012, when the Henry Hub price dropped to the lowest level in over ten years, averaging $2.65/MMBtu. According to industry estimates, this resulted in 5.1 Bcfd coal-to-gas fuel switching. Estimates for this summer indicate that a $2.50/MMBtu natural gas price could result in 4-5 Bcfd of incremental natural gas demand from power generators.

Slide 13



Similar to natural gas, forward peak power prices are down by an average of 24 percent from this time last year. By region, this ranges from down 34 percent at the ISO-NE internal hub to down 13 percent at the Mid-Columbia hub, reflective worsening drought conditions in the Pacific Northwest. These price changes are further driven by regional differences in generating resources, fuel input costs, and other market fundamentals.

Slide 14



In November, PJM and NYISO implemented Coordinated Transaction Scheduling, which provides market participants with the option to submit intra-hour bids between the two regions. These 15-minute transactions are an additional way trade power between these RTOs and represent approximately 5 percent of the total flows between the two regions. They are based on forward-looking prices, as determined by PJM and the NYISO's dispatch and real-time commitment tools. CTS transactions are intended to improve the overall efficiency of electricity sales between the regions by allowing market participants to access the least-cost source of power, thus helping to lower the combined energy production costs of both RTOs.

This graphic depicts the timelines of the typical hour-ahead, or non-CTS, transaction as well as the new CTS transaction. The major difference between the two is that the CTS transaction is finalized 15 minutes before the actual flow of power, which increases the likelihood that a transaction will be economically efficient, or flowing from a region with lower prices to one with higher prices. Additionally, CTS integrates both the bid evaluation and checkout processes, which reduces the potential for a transaction to be scheduled, but subsequently cancelled.

CTS transactions have been economic in the vast majority of instances, averaging 83 percent of the time since their inception in November. By comparison, non-CTS

trades were only economic 56 percent of the time in 2014. Staff will be monitoring the volumes and pricing trends of the CTS transactions over the course of this summer.

Slide 15

Significant changes have recently been made in both the structure and operation of the wholesale power markets.

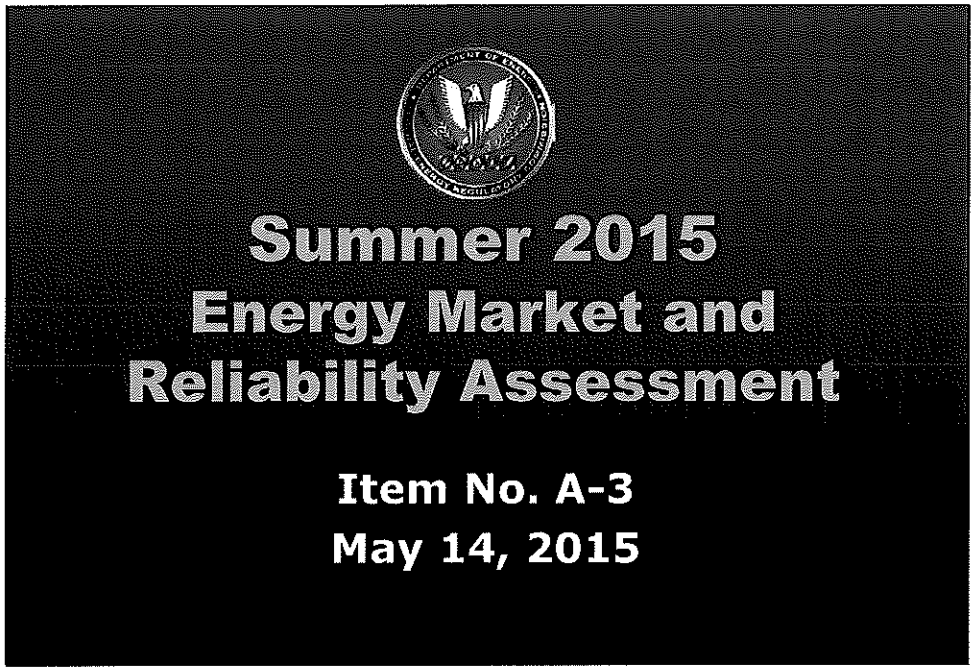
The California ISO Energy Imbalance Market started in November and will be entering its first summer. The EIM enables entities with balancing authority areas outside of the CAISO to voluntarily take part in the imbalance energy portion of the CAISO real-time market, alongside participants from within the CAISO balancing area. This market provides services to five western states served by PacifiCorp.

This will be the first summer where ISO-NE makes use of hourly offers in its market. Hourly offers were initiated in December and allow resource owners to submit up to 24 separate hourly offers for the following day, and to allow participants to update their offers during the operating day. Previously, resources were limited to a single offer for all hours of the following day, and were only provided with a single opportunity to revise the offer before the operating day. Additionally, resources could not alter their offers during the operating day. The ISO has also enabled resources to submit negative offers as low as -$150 per MW/hour. This is intended to improve price signals to resource owners to reduce output or shut down when consumer demand is low and there is a risk of excess generation. This should help to enhance reliability and efficiency during periods of system-wide stress.

The operation of MISO South, as part of the greater MISO footprint, will enter its second summer this year. Similarly, SPP has completed its first full-year of operating a full nodal market in March.

Staff will be monitoring these developments and market performance to assess any implications that may arise under this summer's peak load conditions.

Slide 16



This concludes staff's assessment. A copy of this presentation will be posted on the Commission's website. Thank you.

Attachment 5

2015 ITP10 Scope

Approved by ESWG: 03/24/2014
Approved by TWG: 03/28/2014

ESWG / TWG / SPP Staff

SPP Southwest Power Pool

Table of Contents

Overview

This document presents the scope and schedule of work for the Integrated Transmission Planning (ITP) 10-Year Assessment. This document will be reviewed by the Transmission Working Group (TWG) and the Economic Studies Working Group (ESWG) beginning May 2013, with the expectation of approvals from the Market Operations and Policy Committee (MOPC) and the Board of Directors (BOD) in October 2013. The assessment begins in July 2013 and is an 18-month study scheduled to be finalized in January 2015.

Objective

The 2015 ITP 10-Year Assessment (ITP10) is a value-based planning approach that will analyze the 10-year out Transmission System and identify 100 kV and above solutions to needs stemming from multiple sources: (a) needs identified in the reliability analysis of the 69 kV and above system, (b) needs identified to meet projected renewable policy mandates and goals, (c) needs arising from transmission system congestion, and (d) needs arising from instability of the transmission system.

The 2015 ITP10 will be utilized in integrating the 2013 ITP20 with the 100 kV and above facilities to incorporate such needs as the following: a) resolving criteria violations; b) mitigating known or foreseen congestion; c) meeting projected policy mandates and goals; d) improving access to markets; d) the staging of transmission expansion. This assessment is not intended to review each consecutive year in the planning horizon, but only the horizon year.

Stakeholder Process

Working Group Involvement

The 2015 ITP10 will be vetted through the SPP working groups. The ESWG will oversee the economic portions of the 2015 ITP10 and all related data and assumptions. The TWG will oversee the reliability portions of the 2015 ITP10 and all related data and assumptions. The following items will be discussed at the respective working groups:

Regional Cost Allocation Review Rask Force (RARTF)

A regional cost allocation review will be performed in conjunction with the ITP10 process to identify potential project solutions to mitigate Benefit inequities which exist in certain zones.

Transmission Working Group (TWG), Model Development Working Group (MDWG)

The TWG and/or the MDWG will be responsible for reviewing the data and results for the following items:

1) Scope
2) Futures - Approval
3) Load Forecast – Peak Demand
4) Steady State Models
5) Constraint Review
6) Reliability Assessment
7) Stability Assessment
8) Transmission Plan Development
9) Benefit Metrics
10) Report

Economic Studies Working Group (ESWG)

The ESWG will be responsible for reviewing the data and results for the following items:

1) Scope
2) Futures – Development and Approval
3) Policy Survey
4) Load Forecast - Energy
5) Generator Review

6) Resource Plan and Siting
7) Economic Modeling Assumptions
8) Policy Assessment
9) Economic Assessment
10) Transmission Plan Development
11) Benefit Metrics
12) Sensitivities
13) Report

Markets and Operations Policy Committee (MOPC)

The MOPC will be sought for endorsement of the following items:

1) Scope
2) Futures
3) Policy-Driven Decisions
4) Metrics
5) Report

Strategic Planning Committee (SPC)

The SPC will be sought for endorsement of the following items:

1) Futures

Seams Steering Committee (SSC)

The SSC will be responsible for the review of the following item:

1) Seams Impacts

Regional State Committee (RSC)

The RSC will be responsible for the following items:

1) Approve Cost Allocation
2) Review the final Report and endorse as appropriate

Board of Directors (BOD)

The BOD will approve the following items:

1) Transmission Plan

2) Cost and Benefit Allocation

3) Report

The final 2015 ITP10 Report will be approved by the BOD.

Stakeholder Reviews

The following is a list of reviews to be provided by stakeholders during the 2015 ITP10 study:

Load Forecast Review

Projected peak load per area for the year 2019 and 2024 will be submitted by the modeling contacts for the development of a peak 2019 and 2024 model. Energy per area for 2019 and 2024 will be obtained from publicly available sources and reviewed and updated by stakeholders. Stakeholders will review projected peak load and energy per area. Peak load and energy will also be identified for load serving entities within SPP RTO areas (for example, Hastings Utilities and City of Grand Island load will be reviewed by NPPD).

Policy Survey

Stakeholders will provide feedback through a survey, conducted by the ESWG, on current and planned renewable generation plants.

Generation Resource Plan Review

ESWG will review the data for all generators added to the model as part of the 2015 ITP10 resource plan. This will include conventional and renewable generation. The review will focus on the siting and capacity of new units. For conventional generation, the zonal demand and capacity figures will be provided, as well as expected capacity margins for 2024. For renewable generation, the siting, capacity, and average capacity factor of each new resource will be provided. This will include resources identified as a part of the Policy Survey and may include renewable resources identified by the resource planning software.

Economic Model Review

ESWG will be provided with model data indicating generators and the parameters used in the economic model. Non-confidential parameters such as maximum capacity, ramp rates, O&M costs, etc. will be provided for review. For confidential parameters, such as heat rates, publicly available data will be utilized. However, resource owners may modify the publicly available data to more accurately model their generator's characteristics as appropriate.

Constraint Assessment Review

A list of constraints will be developed to be used in the economic dispatch, as detailed in the Constraint Review Section below. The constraints will be provided to the TWG for review; they will approve the final list of constraints to use, as well as the associated constraint ratings.

Power Flow Model Review

TWG and MDWG will review the economically-dispatched power flow models and provide feedback. The review will focus on the reactive needs.

Project Development Request

Stakeholders will be asked to provide suggestions on projects they believe should be analyzed in the study. All stakeholder-submitted project requests will be analyzed to assess the project's potential to meet needs. This includes reliability, economic, and policy needs as detailed in the Analysis Section of this document.

Study Process

1. The futures will be selected and assumptions refined through the various stakeholder groups (ESWG, TWG, MOPC, RSC).

2. The ESWG will oversee the development of the economic models that incorporate the assumptions developed in step #1 above, including review of data and results. Similarly, the TWG will oversee the development of the power flow and stability models used in this analysis, including a summer peak case and an off peak case. These will be developed through the existing SPP Planning Model Process via the MDWG.

3. Constraints will be developed through the identification of congested facilities and by performing transfer analyses. All constraints will be 100 kV and above facilities for 100 kV and above facility outages within SPP and first tier neighbor systems.

4. Staff will perform an initial AC analysis using applicable NERC Reliability Standards and SPP Criteria on power flow models that represent the applicable load profiles and generation dispatch associated with each future. The assessments will be limited to the planning horizon year. All facilities 69 kV and above in the models will be monitored within SPP and the first-tier for this analysis as a means to determine 100 kV and above solutions for SPP to the problems identified. The TWG will review the results.

5. Concurrently, an economic assessment will be performed to analyze congested facilities on the SPP Transmission System. This will be done using a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED) model over 8,784 consecutive hours.

6. 100 kV and above solutions to criteria violations, policy requirements, and/or congested facilities will be identified with input from stakeholders and coordinated as applicable with SPP neighbors. Staff will request suggestions for solutions from stakeholders and perform a preliminary assessment of benefits for these projects. During this phase, Staff will coordinate solutions with the AG and GI Study processes to best accommodate the high-demand areas for the SPP transmission system footprint. Issues identified that are not resolved with 100 kV and above solutions will be deferred to ITP Near-Term Assessments for resolution.

7. A check will be performed to determine if projects identified in the 2013 ITP20 will eliminate or defer any projects identified in the 2015 ITP10. This check will be performed by replacing lower voltage solutions with the higher voltage solutions identified in the 2013 ITP20 and re-running the economic and contingency analysis. The economic analysis will include calculating benefit and cost for each alternative.

8. A follow-up analysis will be performed by Staff repeating the steps above on the identified solutions to validate the solutions and check for any additional criteria violations and/or congested facilities that may have been created.

9. A sensitivity analysis will be performed on the recommended portfolio to assess how versatile the plan is in handling a range of uncertainties.

10. Benefit metrics will be calculated for the recommended portfolio on each future.

11. A 40-year financial analysis will be conducted on the recommended portfolio.

12. Stability analyses will be conducted on the recommended portfolio to determine if voltage stability requirements for the region are met. Dynamic stability analysis will be performed on the Business As Usual Future. A wind transfer voltage stability analysis will be performed on each future.

Data inputs

Economic

The analysis for the 2015 ITP10 will utilize engineering models to facilitate the development of long range transmission plans. One set of models will be the economic models used to produce a market based resource dispatch used in the analysis. These models require certain assumptions regarding generation resources, parameters, and locations (detailed in the following sections). The output of these models will allow engineers to identify the appropriate transmission additions needed from an economic perspective. This output can also be used to determine deliverability of the resources to market used in the analysis.

The major assumptions needed to construct the economic models are detailed below and contain, but are not limited to: market structure, load forecasts, resource forecasts and parameters, transmission topology, renewable assumptions, fuel pricing and availability, etc. Once these assumptions are input into the model, it will perform a security constrained unit commitment (SCUC) and security constrained economic dispatch (SCED).

The following sections detail the parameters to be used in the economic portion of modeling.

Market Structure

SPP anticipates implementing its Integrated Marketplace and Consolidated Balancing Authority (CBA) in March 2014. The Integrated Marketplace and CBA will be baseline assumptions for the analysis.

Futures

Future 1: Business as Usual

This future will include all statutory/regulatory renewable mandates and goals as well as other energy or capacity as identified in the policy survey, load growth projected by load serving entities through the MDWG model development process, and the impacts of existing regulations. This future assumes no major changes to policies that are currently in place.

Future 2: Decreased Base Load Capacity

This future will consider factors that could drive a reduction in existing generation. It will include all assumptions from the Business as Usual future with a decrease in existing base load generation capacity. This future will retire coal units less than 200 MW, reduce hydro capacity 20% across the board, and utilize the Palmer Drought Severity Index for an average of August 1934 and August 2012 to simulate a reduction in existing capacity affected by drought conditions: 10% under moderate, 15% under severe, and 20% under extreme. These target reductions may be adjusted based on locational and operational characteristics within each zone.

Load Forecasts

The study will require load forecasts for SPP members and non-members within the SPP footprint, as well as areas outside of the SPP footprint, for the year 2019 and 2024. SPP Staff queries its

members through the MDWG for applicable load forecasts to use in each of the zones for the modeling footprint. The base model will also include additional load expected in the SPP region. This load will include a 50/50 forecast from the High Priority Incremental Load Study (HPILS) and will be vetted through the ESWG and the TWG. Energy forecasts will be provided by the ESWG and other contacts. Load shapes will be obtained from publicly available data for the typical load projections and requested from stakeholders for the HIPILS loads. Load shapes will be benchmarked as detailed in the Benchmarking Section.

For load forecasts outside of the SPP footprint, SPP will request load forecasts from SPP tier 1 neighbors. If data is not provided, publicly available data will be utilized as the source of the load forecasts, where available. If unavailable, publicly available information on projected load growth will be extrapolated to develop a representation for load expected in the study timeframe.

Resource Plan

A generation resource plan for 2019 and 2024 will be developed for use in the study for each future. This resource plan will include both renewable and conventional generation. Additionally, new renewable and conventional generation resources will be sited as detailed below.

Each SPP RTO load serving member must meet the current 12% capacity margin requirement outlined in SPP Criteria 2.1.9. The siting of new generation in the resource plan will target a 12% capacity margin for each zone. Capacity needs will be identified for each future for 2019 and 2024.

Renewable generation, for the purposes of this study, includes hydro, wind, solar, and bio-fuel. Designated renewable resources will be identified through the policy survey. Additional renewables will be included in the plans, as needed, to meet the renewable projections, as supplied by the Policy Survey. Additional renewables identified by the resource planning software may also be included. The renewable ownership designations will be reviewed by stakeholders and posted on SPP.org.

SPP tier 1 neighbors will be provided the opportunity to provide feedback and input into the generation resource plan for their area.

System Topology

The focus of the Study is to develop a comprehensive, flexible, and cost-effective transmission expansion plan to meet the requirements of the SPP footprint under various futures.

Power flow models will be required for the Study for both the economic and reliability assessments. The starting point of these power flow models will be the latest MDWG information from Model on Demand™, which includes the current projects from the latest SPP Transmission Expansion Plan (STEP). These power flow models will serve as an input into the economic (production) modeling program to develop a market based economic dispatch for the system.

Two new DC interconnections, the Tres Amigas DC Tie and the Clean Line Plains & Eastern project, will be included in the models for sensitivity analysis only.

Economic Model Generation Parameters

The generation parameters (Startup cost, operating costs, Min/Max Operating Levels, etc.) will be updated by the ESWG as part of the economic model review.

Renewables

Renewable generation, primarily wind, hydro, and solar, operate as energy resources that will require the development of hourly generation profiles for individual plants based on historical data or modeled time-series wind speed datasets. These generation profiles will be time-synchronized with coincident historical load shapes. The economic dispatch model will attempt to realistically model renewable generation curtailment, based on expected market conditions and reliability requirements. A curtailment price consistent with the variable O&M cost will be used to simulate the behavior of the wind generation within the Security Constrained Economic Dispatch (SCED). The ESWG will review the behavior and costs of the renewable generation against appropriate benchmarks.

Siting

The expected location of future generation will be considered in areas with appropriate potential. These sites will be further developed and refined as a subset of those selected in the 2013 ITP20 study, as appropriate for the futures of this study. SPP will request that tier 1 neighbors provide siting based on SPP's identification of capacity needs from the resource plan. If siting is not provided, SPP will site new generation.

DC Ties and Lines

DC ties and lines connect SPP to the WECC and ERCOT and Eastern Interconnect systems. Confirmed long-term firm transmission service will be used as a basis for modeling the flow levels of DC ties and lines. Hourly profiles will be developed based on 3-year historical flows on the DC facilities, limited to boundaries of existing long-term firm service commitments. The hourly profiles will be vetted with ESWG and TWG. The cost of energy purchases and sales across the DC ties will be calculated using the hourly average zonal generation locational marginal price of each utility owner multiplied by their ownership share of the output. No curtailment price will be assumed for the long-term firm service profile. For those DC ties or lines with no confirmed long-term firm transmission service, Staff will model no flow across the DC ties and lines.

Fuel Prices

Fuel forecasts will be utilized in the resource planning, production cost modeling, and benefit metric calculations. Fuel prices for coal, oil, and uranium, including transportation costs, will be forecasted for the 2024 study year based upon the latest Ventyx Reference Case available at the onset of the study. NYMEX futures will be utilized for natural gas prices, out to the latest year for which the futures are available. For natural gas prices beyond this year, growth rates from the DOE Annual Energy Outlook will be utilized. The specific NYMEX and DOE numbers will be developed during the resource planning phase of the study and then locked down for the remainder of the study.

Environmental Policy

Emission price forecasts for SO_2, NO_X, and CO_2 for the 2024 study year will be based upon the latest Ventyx Reference Case data available at the onset of the study.

Policy Survey

A policy survey will be administered by the ESWG and will be used by stakeholders to provide assumptions regarding specific renewables information. The previous renewables surveys will be used as a reference for development of the current survey. The survey will contain, at a minimum, the following information:

- Name, zone, and capacity for all specific renewable sites that are in-service or expected to be in-service by the end of 2014;
- Renewable energy totals for 2024 and 2019 based on state and utility mandates, goals, and other utility company policy;

For all renewable sites in the models, the renewable energy output for each hour of the year will be based on the maximum capacity provided in the survey. Capacity factors and hourly profiles will be based on expected or historical behavior. Calculations for policy requirements will incorporate stakeholder specific inputs, and capacity factors for wind used in the Study will be based on NREL wind profiles that correspond to a similar location as the wind site and are based on historical weather patterns. For new wind sited to meet the requirements of the Policy Survey and resource plan, a 15% increase will be applied to the existing capacity factors being utilized for each of the NREL sites.

Hurdle Rates

Hurdle rates will be utilized in the economic model between SPP and neighboring systems to help keep imports and exports at a reasonable exchange levels. Hurdle rates for imports and exports between SPP and other entities will be determined during the benchmarking process.

Hurdle rates between non-SPP entities will be set as needed to model minimal and reasonable exchange between these entities.

Benchmarking

After all assumptions and data are included in the economic model, it will be benchmarked against historical system behavior. This benchmarking will be used to assess the reasonability of the simulations.

In order to complete the 2015 ITP10 benchmarking effort, a model will be developed based upon the year 2013. Simulation results from that economic model will be compared with historical statistics and measurements from the SPP real time data, NERC data, and the Energy Information Administration data.

The ESWG will review the benchmarking data as part of the model review process. Specific benchmarks will include some or all of the following: capacity factor by unit type, generation by unit category, maintenance outages, load shapes, renewable generation profiles, operating, and spinning reserve levels, coal transportation costs, system Locational Marginal Prices (LMPs), flowgate loading, production costs, generation dispatch order, and zonal purchases and sales.

Steady State

Being that SPP will implement its Integrated Marketplace and CBA in 2014, power flow models with a market dispatch under coincident peak load and off peak load will be developed.

Steady state analysis will be conducted using output from the economic models as a starting reference for load and generation dispatch. These models will be utilized in additional engineering tools in order to conduct an assessment to determine the SPP system's voltage and thermal impacts. This steady state assessment is detailed in sections below.

Load

The load density and distribution for the steady state analysis will be reviewed by the MDWG. Resource obligations will be determined for the footprint taking into consideration what load is industrial, non-scalable type loads and which load grows over time. The MDWG, TWG, and ESWG provide collaborative feedback into the determination of this impact. The load used in the steady state analysis will be the same as that used in the economic model as described in Section: System Topology.

Generation Resources

The generating resources determined through Section A.III: Resource Plan will be added to the power flow. Each future will contain a different subset of generation resources and correspond to a unique power flow case. These generating resources will be reviewed by the ESWG and will correspond to the economic analysis conducted for the Study.

Steady-State System Topology

The topology used in the steady state analysis will be the same as that used in the economic model as described in Section: System Topology.

Exports/Imports to First Tier

The exports/imports used in the steady state analysis between SPP and neighboring AC systems will be determined by the economic dispatch model. Exports and imports between DC interconnections will be based on historical hourly scheduling of long-term firm transmission service. This economic exchange of energy between neighboring systems will be modeled for the steady state analysis.

Market Dispatch

The economic models will be used to determine hourly load profiles and generation dispatch for the steady state analysis. The generation dispatch and corresponding hourly profiles will be mapped from the economic model to the reliability power flow model.

Analysis

Define Constraints

To identify which constraints are applicable in 2024, Staff will begin by reviewing the existing NERC Book of Flowgates (BoF) to determine additions or deletions from the list of constraints (event file) for the economic model. Staff will perform additional analysis using Power Analytics and Trading Tool (PAT) to identify the top constraints by congestion costs (average shadow price times the number of constrained hours) on the system for 8,784 hours. These additional constraints will be reviewed and approved by TWG. The following items will be considered in the analysis:

- The initial constraint list will be the then-current BoF
- Constraints studies will be run over 8,784 hours (1 year)
- This analysis will use the 2024 economic model(s) for each future
- Contingencies 100 kV and above in SPP and first-tier
- Monitored elements 100 kV and above in SPP and first-tier
- Unless other information is available, each constraint's rating will be selected based upon the applicable Rating A (normal rating) or Rating B (emergency rating) in the power flow model.

Needs Assessments

The reliability, policy, and economic needs of the system will be identified in each future in order to develop a transmission portfolio for each future. Each analysis will be performed in parallel to determine all needs across the system in 2024. All needs indentified in the assessments below will be evaluated by Staff for potential consideration in the interregional planning process pursuant to the requirements of Order 1000.

Economic Assessment

The economic needs of the system will be identified in each future in order to develop a portfolio for each future. All of the system needs will be identified through the use of a SCUC & SCED simulation that accounts for 8,784 hours representing each hour of the year 2024.

The SCED will determine nodal Locational Marginal Prices (LMPs) while dispatching the generation economically. The LMPs, among other cost components, reflect the congestion occurring on the power grid's binding constraints. System congestion will be identified in each of the 8,784 hours. A list of binding constraints will be developed for each future and ranked based upon the average shadow price associated with each constraint. The top twenty constraints based upon this ranking will be identified as economic needs. This list may be modified, subject to ESWG review and approval.

Policy Assessment

The policy needs of the system will also be identified for each future in order to develop a portfolio for each future. All of the system needs will be identified through the use of a SCUC & SCED simulation that accounts for 8,784 hours representing each hour of the year 2024. Renewable generation may experience the effects of congestion and be curtailed by the SCED. Shortfall in the achievement of the renewable requirements of each future due to this curtailment will be identified. Renewable resources that experience an annual energy output of less than the statutory/regulatory mandate or goal will be identified as policy needs. The required energy is based on maximum capacity, capacity factor, and generation profile.

Steady State Assessment

The steady state assessment will use 2024 summer peak and high wind with low load (off peak) models based on a market dispatch. Each future will be evaluated for the same peak and off peak hours. An N-1 contingency analysis will be conducted on each future for the peak and off peak cases. All SPP and first tier facilities 69 kV and above will be monitored for this analysis in development of 100 kV and above solutions.

The non-converged contingencies will be reviewed.

Stability Assessment

Dynamic stability analysis will be conducted on the final recommended portfolio for the Business as Usual future to assess transient voltage recovery. It will be conducted on the off peak model simulating the 2013 TPL Category B and C contingencies identified by members and additional contingencies identified by Staff through the Fast Fault Screening tool. TWG will review and approve Staff identified contingencies for further analysis.

A voltage stability assessment will be conducted on each future using the recommended final portfolio to assess the transfer limit (MW) due to transfer of wind west to east across the SPP footprint. These must be determined by examining voltage performance during power transfer into a load area or across an interface. The stability assessment consists of a wind dispatch analysis to determine if the dispatched wind generation in the 2015 ITP10 2024 summer peak models in all futures can be dispatched without the occurrence of voltage collapse or thermal violations.

Solution Development

Staff will solicit stakeholders for possible solutions to the needs. A pool of possible solutions will be used to mitigate the economic, reliability, and policy needs in creating the 2015 ITP10 transmission plan. This pool of solutions will come from transmission service studies, generation interconnection studies, previous ITP studies, and stakeholder input. Solutions developed could meet more than one need (i.e. economic, policy, and/or reliability needs) and will be classified as project types based on the criteria outlined below. To the extent benefit to cost deficient zones are identified as a result of the Regional Cost Allocation Review, remedies will be evaluated and recommended by Staff, in coordination with the deficient zones and appropriate stakeholder groups, as part of the 2015 ITP10 analysis as appropriate.

Based on the criteria below, Staff will develop a plan for each future. Staff will then consolidate the projects from each future into a recommended plan.

Economic Project Solutions

Economic projects will be developed and evaluated based upon how well they mitigate congestion. Any economic project with a one-year B/C ratio of 0.9 or greater will be included for further evaluation.

Economic seams projects will be initially evaluated and considered under the assumption that the project would be cost shared with an SPP neighbor, with SPP paying for 80% of the cost and the neighbor paying 20% of the cost. As the evaluation progresses and the SPP neighbor identifies the level with which the transmission project benefits them, then the cost percentages should be updated to a more accurate reflection of the benefit distribution.

Policy Project Solutions

Policy projects will be developed and evaluated based upon how well they mitigate curtailment of renewable energy required by the regulatory/statutory mandates and goals as defined by the 2015 ITP10 policy survey. Any policy project that helps to mitigate curtailment of renewable requirements will be included for further evaluation.

Reliability Project Solutions

Reliability projects will be developed and evaluated based upon how well they mitigate member criteria violations for the peak and off peak hours.

Interregional Considerations

Seams projects will be considered as part of the 2015 ITP10 study and expansion plan as potential solutions, and SPP will collaborate with neighboring entities regarding the identified needs, benefits, potential solutions, and costs. For the neighbors that SPP has an agreement with, joint coordination will be done in accordance with that agreement.

Final Recommended Portfolio

Reliability, policy, and economic solutions will be grouped together and refined to create a portfolio for each future. The grouping of projects will be evaluated for redundancies. If, for example, a reliability project is similar to a policy project, the two projects will be evaluated to see which project meets both the reliability need and the policy need in the most cost effective way, while the other project is then discarded.The final portfolio for each future will be consolidated into a single portfolio. The consolidation will be based on the following criteria: Economic projects with a 1-year B/C ratio greater than 0.9 in Future 1 will be included in the consolidated portfolio. Economic projects with a 1-year B/C ratio greater than 0.7 in Future 1, but that also have a 1-year B/C ratio greater than 0.9 in Future 2 will also be included in the consolidated portfolio.

Policy projects will be included in the consolidated portfolio if they meet a policy need in Future 1.

Reliability projects will be included in the consolidated portfolio if they mitigate a thermal/voltage violation in Future 1. A Future 2 reliability project will be included if it mitigates a thermal violation in Future 2 and mitigates loading above a 90% threshold in Future 1. A Future 2 project that mitigates a voltage limit violation in Future 2 and voltage below 0.92 pu in Future 1will also be

included in the consolidated portfolio. Thermal and voltage violations are defined by SPP Criteria and local Transmission Owner criteria.

Additionally, projects with significant potential value may be selected to be part of the consolidated portfolio. SPP Staff can request additional projects be included in the consolidated portfolio, but they will be required to present the project and justification to the appropriate stakeholder groups and obtain approval from those groups.

Forty-Year Financial Analysis

The 2015 ITP10 shall assess the cost effectiveness of the recommended portfolio over a forty-year time horizon in accordance with Section III.3.c of Attachment O of the SPP OATT. To estimate the benefits over 40 years, Adjusted Production Cost (APC) savings will be calculated for the two model years developed, 2019 and 2024. The slope between the selected points will be used to extrapolate the benefits beyond 2024 over a 40 year timeframe. The costs will be calculated using the formula for Annual Transmission Revenue Requirement (ATRR). The total benefits and costs will be reported in net present value (NPV) dollars.

Benefit and impact calculations will be made on a Regional, Zonal, and State basis. State values will be extrapolated from the zonal costs and benefits. Many zones are only in one state. For those zones that are only in one state, their full portion of both costs and benefits will be allocated to the state. For zones crossing state borders, their portion of both costs and benefits will be allocated to each state based on their percentage of load that is in each state.

Net benefits and B/C ratios will be calculated based on NPV benefit and NPV cost and will be reported based on present dollars (2014).

Benefit Metric Development and Usage

The metrics used to measure the value of the final portfolio in the 2015 ITP10 are identified here and will be vetted with the ESWG. These metrics will be used to measure the value of the final consolidated portfolio on each Future.

Metric Description
APC Savings
Savings Due to Lower Ancillary Service Needs and Production Costs
Avoided or Delayed Reliability Projects
Marginal Energy Losses
Capacity Cost Savings Due to Reduced On-Peak Transmission Losses
Reduction of Emissions Rates and Values
Public Policy Benefits
Assumed Benefit of Mandated Reliability Projects

Mitigation of Transmission Outage Costs
Increased Wheeling Through and Out Revenues

Table 1: Monetized Cost Benefit Metrics for 2015 ITP10

To the extent that any adjustments or changes to Benefit Metrics are recommended by the Regional Allocation Review Task Force (RARTF), these changes will be considered by the ESWG and TWG.

Sensitivities

Sensitivities will be conducted on the final recommended portfolio for the Business as Usual Future to assess how versatile the plan is in handling a range of uncertainties. Economic analysis will be performed for the sensitivities. The following sensitivities will be performed:

- Natural Gas Price
- Demand levels
- Tres Amigas and Clean Line Plains & Eastern
- Increased Input Prices

Specifics of the DC project sensitivities will be developed and approved by the ESWG.

An Increased Input Prices sensitivity will be performed using the Business as Usual model (resource/siting plan). It will consider a $36/ton carbon tax and a threefold increase of natural gas prices. As a result of increased input prices, it will also consider a reduction in the rate of load growth of 1% per year. This sensitivity will test for two of the benefit metrics; adjusted production cost and reduction of emission rates and values.

The sensitivities will be used to measure the viability of the proposed transmission plan that is produced through the 2015 ITP10. These sensitivities will not be used to develop the transmission projects or filter out projects.

Staging

A project implementation plan will be developed for the final recommended portfolio. The final portfolio will be structured such that each element can be implemented in a staged manner as actual system developments approach the assumptions resulting in the need for that element. To help stage the projects SPP will utilize years 2019 and 2024. This section is broken into two parts: one for projects classified to meet one set of needs (i.e. economic, policy, or reliability needs); one for projects meeting multiple needs.

Single Project Classification

For economic projects in Future 1, Staff will stage projects based on linear interpolation of B/C ratios from 2019 to 2024 with consideration of lead times. For economic projects in Future 2, Staff will stage them with a 2024 need date.

For policy projects, Staff will stage projects in order to meet the renewable requirements.

For reliability projects in Future 1, Staff will stage projects based on linear interpolation of thermal loadings from 2019 to 2024. All other reliability projects in Future 1 will be staged with a 2024 need date. For reliability projects in Future 2, Staff will stage them with a 2024 need date.

Multiple Project Classification

If a project is classified as more than solely economic, policy, or reliability project, the project will be staged to meet the earliest need date established through the Single Project Classification Section with a requirement that for economic projects, the one-year B/C ratio threshold crosses 1.0.

Reactive Needs

If any 300 kV and above upgrades are identified as solutions in the portfolio, line-end reactive requirements analysis will be performed for the new transmission lines greater than 300 kV system to provide an indicative amount of reactor needs before design level studies are completed.

Final Reliability Assessment

A steady state N-1 contingency analysis will be conducted to identify any remaining outstanding issues on the final recommended portfolio.

Cost Estimates

The cost estimates used for projects that are tested in the initial project development phase will be Conceptual Estimates as defined by the SPP Business Practice 7060. The Conceptual Estimates will be developed by Staff and utilize standardized estimates and multipliers that are based on historical data. Projects that pass the initial screening phase will be designated for Study Estimates as defined by Business Practice 7060.

A Study Estimate will be prepared by the designated TO(s) for non-competitive upgrades and by Staff for competitive upgrades by completing a Standardized Cost Estimate Reporting Template (SCERT) for all upgrades that are required to complete that project. The Study Estimate will provide a more refined cost estimate for potential project approval. For all Study Estimates, Staff will provide TO's a minimum of six weeks from the date of request before the estimate is due.

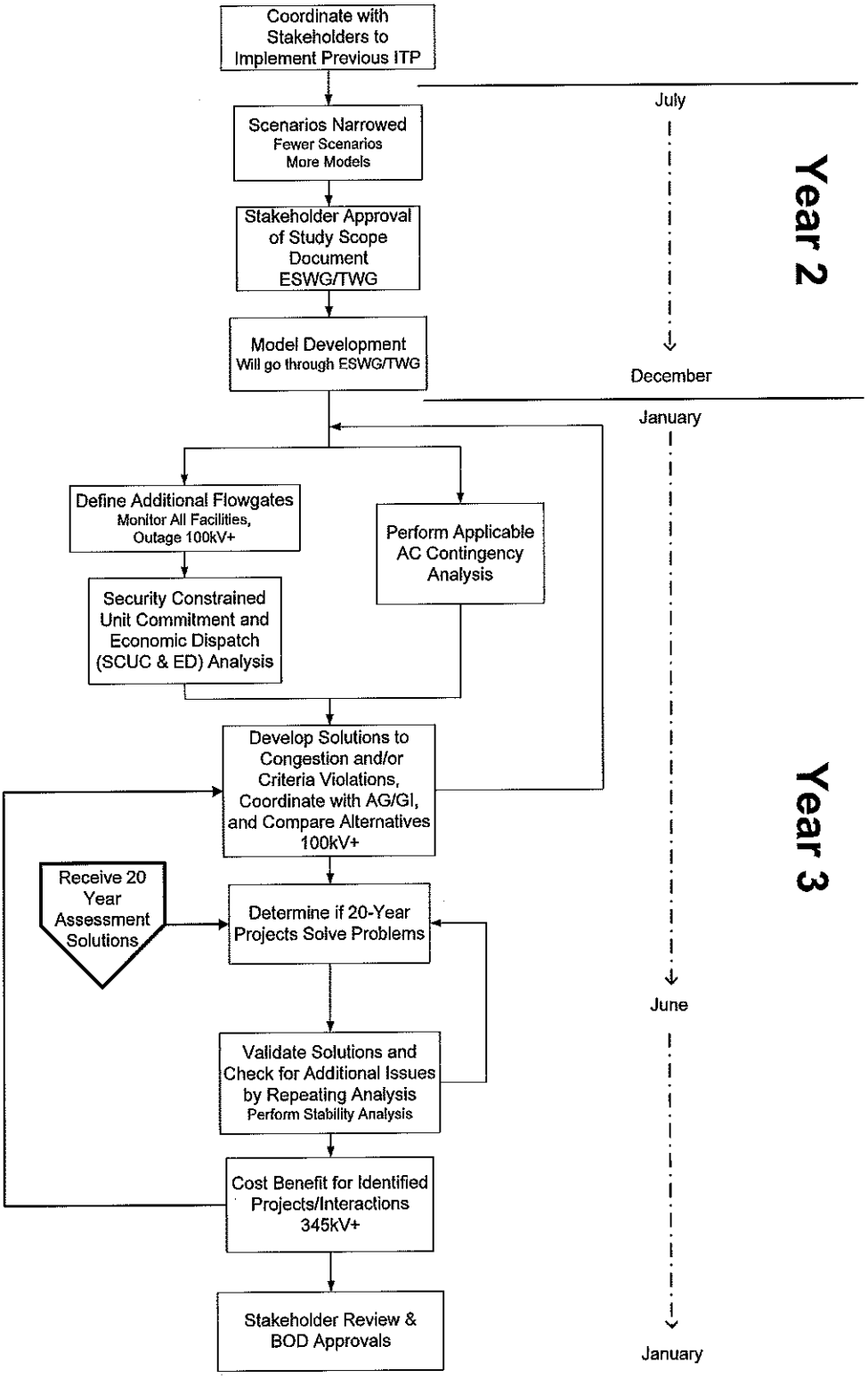
Timeline

The 2015 ITP10 will generally follow the process flow below beginning in July 2013 with final results in January 2015. The estimated timeline is as follows:

2015 ITP10	Group(s) to review/endorse	Start Date	Completion Date
Futures & Scope	ESWG, TWG	April 2013	October 2013
Policy Survey	ESWG	May 2013	August 2013
Load Forecast and Generation Review	ESWG, TWG	May 2013	August 2013
Resource Plans Development & Review	ESWG	August 2013	October 2013
Siting Plan	ESWG	September 2013	October 2013
Economic Model Development & Review	ESWG	May 2013	December 2013
Model Benchmarking	ESWG	January 2014	
Constraint Review	TWG	November 2013	January 2014
Economically-dispatched Powerflow Model Development & Review	TWG	January 2014	April 2014
Reliability, Policy, Economic Needs Assessment	ESWG, TWG	February 2014	April 2014
Finalize benefits metrics and allocation methods for ITP10 portfolio analysis	ESWG, TWG	April 2014	April 2014
Project Development Request	ESWG, TWG	April 2014	May 2014
Project Grouping	ESWG, TWG	June 2014	June 2014
Final Recommended Portfolio	ESWG, TWG	June 2014	July 2014
Project Staging	ESWG, TWG	July 2014	August 2014
Sensitivities Conducted	ESWG	July 2014	September 2014
Final Benefit Metrics Calculations	ESWG	July 2014	September 2014
Stability Analyses	TWG	May 2014	September 2014
Review draft report with recommended solutions	ESWG, TWG	July 2014	September 2014
	MOPC	October 2014	
Final report with recommended solutions	ESWG, TWG	November 2014	December 2014
	RSC	January 2015	

	MOPC
	BOD

10-Year Assessment Process (Initiated Every 3 Years)



Deliverables

Final Report and Recommended Portfolio

The results from the 2015 ITP10 will be compiled into a report detailing the findings and recommendations of SPP Staff. The report will include a project list identifying each upgrade. This report will also be incorporated into the 2015 STEP Report.

Staging and Timing of Project Implementation

A project implementation plan will be developed for the recommended transmission plan. The final plan will be structured such that each element can be implemented in a staged manner as actual system developments approach the assumptions resulting in the need for that element. Each element will have at least one of the following justifications: policy, economic or reliability justification. NTCs/NTC-Cs will be issued for the 2015 ITP10 plan elements in accordance with the Tariff, Attachment O, Section VI and SPP written procedures (see Business Practice 7060[1]).

Changes in Process and Assumptions

In order to protect against changes in process and assumptions that could present a significant risk to the completion of the 2015 ITP10, any such changes must be vetted. If a stakeholder group votes on any process steps or assumptions to be used in the study, those assumptions will be used for the 2015 ITP10. Changes to process or assumptions recommended by stakeholders must be approved by the appropriate stakeholder group(s) and the MOPC. This process will allow for changes if they are deemed necessary and critical to the ITP, while also ensuring that changes, and the risks and benefits of those changes, will be fully vetted and discussed.

[1] SPP.org > Org Groups > Access SPP's Governing Documents > OATT Business Practices

Attachment 6

Effects of Ground Voltage or Stray Current on Infrastructure Caused by High Voltage Direct Current (HVDC) Transmission Lines

Prepared by Renée McHenry, Transportation Librarian
Prepared for Jim Smith, Design Liaison Engineer

May 29, 2014

Background: The requester asked for background information concerning the effects of ground voltage produced by a high voltage direct current transmission line and its potential effects on steel or iron products which are part of a state DOT's infrastructure. The requester was contacted by a property owner who is concerned about the proposed Grain Belt Express High Voltage Transmission line.

Discussion:

- The effect of stray current corrosion on underground infrastructure has been a concern for decades. As one example, a 1967 article warned about the "stray current corrosion of **underground metallic structures**" caused by HVDC transmission lines. [10]
- In the literature, most studies are concerned about potential damage to **pipeline structures**. Sometimes, the structures are referred to more generically. For example, the Corrosion Wiki from NACE International states that "stray currents which cause corrosion may originate from **direct-current distribution lines**, substations, or street railway systems, etc., and **flow into a pipe system or other steel structure**."
- The most recent reference related to the stray current corrosion of **bridge structural elements** was Caltrans' *Corrosion Guidelines* (see below).
- Based on information at the Grain Belt Express website, the company is considering a **monopole system**.
    - According to a 2010 NACE International paper, "monopolar systems use the earth or preferably sea water as the return circuit, whereas bipolar systems only use the earth or sea water during electrical upsets or faults." [8]
    - According to a 2008 Argonne National Laboratory study, "when the current return is through the ground … this return path presents a danger to **buried metal infrastructure** through electrocorrosion." [2]
- According to European sources, how DC stray current affects reinforced concrete varies. The most damaging effects are seen when the **rebar is already corroded**. [17]

I have excerpted professional opinions from the literature below as to whether and how stray current corrosion from HVDC transmission lines might affect underground structures.

Contents

Effects of Stray Current Corrosion on Infrastructure

Caltrans

The 2012 edition of *Corrosion Guidelines* published by the California Department of Transportation addresses the effect of stray current corrosion as it applies to **bridge structures, long steel culverts and pipes.** [1]

- "Stray current corrosion (interference corrosion) is corrosion caused by **direct current** from an external source that travels through paths other than the intended circuit. Accelerated corrosion may result if the current is collected by a structure and leaves to enter the soil. Stray currents in bridge structure elements can be caused in two ways, either **through direct connection or through a soil gradient**."
- "**Direct connection involves attaching a pipeline, electric railway track, or high-voltage contact system to bridge structure elements**. Installation requires an approved insulator between the pipe or rail and the bridge element, and the high-voltage contact

system requires double insulation for safety. Since concrete is not an insulator, a failed insulator, even if connected only to the concrete, will cause corrosion in bridge structure elements."

- "Measures must be taken to mitigate possible stray current problems whenever they are anticipated or suspected."

FHWA

Mechanically stabilized walls [14]

"Stray currents may be an additional source of corrosion for [Mechanically Stabilized Earth Wall] MSE systems constructed adjacent to electrically powered rail systems or other sources of electrical power that may discharge current in the vicinity of these systems, such as existing utilities, cathodically protected radio stations, etc."
"In general, stray currents decrease in magnitude rapidly as they move away from the source and are believed not to be a factor 100 to 200 ft (30 to 60 m) away from the source. For structures constructed within these distances, AASHTO recommends that a corrosion expert evaluate the hazard and possible mitigating features on a project-specific basis. Furthermore, it is recommended that a long-term corrosion monitoring program be integrated into the design, if steel reinforcements are used."

Ground anchors [15]

"Stray current corrosion occurs as pitting of prestressing steel when subject to prolonged exposure to stray electrical currents. Stray currents in the ground result from the discharge of direct electrical current from power sources such as electric rail systems, electrical transmission systems, and welding operations and is particularly damaging in the marine environment. Power sources beyond a distance of 30 to 60 m from a ground anchor are believed to not cause a significant amount of stray current corrosion (FHWA-SA-96-072, 1995). Protection of anchors from stray currents commonly involves complete electrical isolation of the prestressing steel from the ground environment with a nonconducting barrier such as plastic."

Tunnels [16]

Corrosion is associated with steel products embedded in the concrete and otherwise used in tunnel applications. Ground water, ground chemicals, leaks, vehicular exhaust, dissimilar metals, deicing chemicals, wash water, detergents, iron eating bacteria and stray currents are all sources of corrosion in metals.
Increased concrete cover over reinforcing steel is an effective means of protecting reinforcing steel from corrosion. Increasing the concrete cover, however will also increase the thickness of the lining. The increased thickness will result in a larger excavation which will increase the overall cost of the tunnel. The use of increased concrete cover should be evaluated in terms of the overall cost of the tunnel compared to the benefit derived.

NACE International

NACE International has tasked its Technical Committee on Reinforced Concrete: Stray-Current-Induced Corrosion (TG 356) with writing "a standard practice on detection and mitigation of DC and AC stray-current-induced corrosion of **reinforced and prestressed concrete structures**." [18] The standard was sent to NACE in 2014 for balloting.

Other

Reinforced concrete [17]

A technical handbook published in Europe on the corrosion of steel in concrete concludes that DC stray current causes the most damage in reinforced concrete when rebar has already been corroded (see excerpt below).

> Stray current can also flow through reinforced or prestressed concrete and produce an alteration of the potential distribution inside the concrete, which can influence corrosion of embedded steel [2, 3]. Several types of structures may be subjected to stray current, such as bridges and tunnels of railway networks or structures located in the neighborhood of railways. Here, the concrete, like the soil surrounding buried structures, is the electrolyte and the reinforcing bars or prestressing tendons can pick up the stray current. Laboratory studies have shown that stray DC current rarely has corrosive consequences on steel in concrete, in contrast to their effect on metallic structures in the soil [2–7]. In fact, passive steel in alkaline and chloride-free concrete has a high intrinsic resistance to stray current. Nevertheless, under particular circumstances corrosion can be induced on the passive reinforcement, especially if chlorides contaminate the concrete, even at levels in themselves too low to initiate pitting corrosion. A few cases have been documented [8, 9].
>
> ### 9.1 DC Stray Current
>
> Consequences of DC stray current in reinforced concrete vary, depending on the properties of the concrete (alkaline, carbonated or contaminated by chlorides), the duration of the current circulation and the current density. It is therefore necessary to distinguish concrete structures noncontaminated by chlorides and noncarbonated from those contaminated by chlorides in quantities insufficient to initiate corrosion and, finally, from those that already have corroding rebars due to chlorides or carbonation.

Chapter 9.1 of the handbook discusses in **greater technical detail how DC stray current corrodes reinforced concrete**. One of the reference sources cited in this section is a 2010 NACE International paper Stray-Current-Induced Corrosion in Reinforced and Prestressed Structures. It is not available through interlibrary loan but is available for purchase from NACE.

U.S. General Accounting Office (GAO)

A 2008 GAO report addressed right-of-way issues associated with HVDC transmission lines. The authors identified a risk "associated with siting HVDC electric transmission lines along active transportation ROW … Stray current could interfere with railroad signaling systems and highway traffic operations, and accelerate pipeline corrosion, resulting in accidents." [4]

Effects of Stray Current Corrosion on Pipelines

Argonne National Laboratory

Argonne National Laboratory is a non-profit science and engineering research laboratory operated by the University of Chicago for the Department of Energy. A 2008 technical memorandum discussed the design, construction, and operation of long-distance high-voltage electricity transmission technologies. See relevant excerpts below from page 54. [2]

- "When 'metallic return,' that is, a separate conductor not used to carry power, is used, HVDC power transmission does not produce ground currents or any attendant concerns."
- "When the current return is through the **ground**, however, the current path between grounding installations of HVDC converter substations lies through the whole thickness of the Earth, while environmental impacts are limited to the moderate area near grounding installations. If, however, there is an available buried conductor, such as a pipeline, current will return through this conductor. **This return path presents a danger to buried metal infrastructure through electrocorrosion. The degree of corrosion depends on the quality of electrical insulation and the effectiveness of the means of electrical corrosion control used with the metal infrastructure present, as well as on the amount of current passing through the object.**"
- "Cathodic protection of **buried pipelines or other underground metal objects near the grounding installation** might be needed to prevent rapid corrosion of this infrastructure."

ASM

ASM International, formerly known as the American Society for Metals, is a professional organization for materials engineers. Their multi-volume *ASM Handbook* is considered a comprehensive and definitive series of reference books with data on various metals. The information excerpted below is from Volume 13C on Corrosion: Environments and Industries. [7]

- "Corrosion of underground pipelines can be accelerated by stray dc flowing in the soil near the pipeline. Sources of direct electrical current include foreign pipelines that are not properly bonded to the pipeline and ground currents from dc sources. Electrified railroads, mining operations, and other similar industries that utilize large amounts of dc sometimes allow a significant portion of current to use a ground path return to their power sources. These currents often utilize pipelines in close proximity as a part of the return path. This 'stray' current can be picked up by the pipeline and discharged back into the soil at some distance down the pipeline close to the current return. Current pickup on the pipe is the same process as cathodic protection, which tends to mitigate corrosion. The process of discharge of a dc off the pipe and through the soil accelerates corrosion of the pipe wall at the discharge point, causing stray current corrosion. The morphology of stray current corrosion tends to be very localized at holidays (defects or holes) in the pipeline coating. Rates of attack can be very high, resulting in rapid perforation of a pipeline."

ASTM

ASTM International, formerly known as the American Society for Testing and Materials, is a technical standards organization. Chapter 5 of their *Manual of Industrial Corrosion Standards and Control* addresses stray current. See relevant excerpts below. [6]

- "No matter what the source of the stray direct current may be, there is no damage, normally, where the current is picked up from the earth by the pipeline, but where this same current is discharged back to earth to continue its journey to its source, corrosion attack does occur."
- "Direct-current transmission lines (known as HVDC systems) involve an additional source of possible stray current corrosion on pipeline systems. Under present concepts, HVDC systems involve transmission of bulk electric power between terminals which may be several hundred miles apart. At each of the terminals there is a high-capacity grounding electrode through which unbalanced system current can flow to or from the earth. Under conditions of unbalance on the HVDC lines, the magnitude of this unbalance current can be quite great, and it will be flowing, as stray current, through the earth along the possibly several-hundred-mile-long path between terminals. The worst condition develops during operation of the HVDC system under emergency conditions with one overhead conductor completely inoperative; full load current then flows through the earth path and through the remaining overhead conductor. Pipeline systems in the vicinity of the terminals will be subject to possible stray current pickup or discharge, depending on the nature of the HVDC transmission line unbalance condition. With improperly designed terminal equipment, or for pipeline systems located too close to HVDC system terminals, pipeline corrosion can be severe. Although the use of HVDC electric transmission systems is presently quite limited, the concept involved is getting greater acceptance with time, and interference from this type of system may ultimately become more prevalent."
- "Installation of HVDC terminal grounds should be located a sufficient distance from the nearest pipeline systems to minimize the amount of stray-current pickup by the pipelines, assuming that the terminal ground is properly designed."

NACE International

NACE International, also known as the Corrosion Society and formerly known as the National Association of Corrosion Engineers, is a professional organization for corrosion control professionals. Their website maintains a Corrosion Wiki (see excerpts for stray current corrosion below). [3]

- "Stray currents which cause corrosion may originate from **direct-current distribution lines**, substations, or street railway systems, etc., and flow into a pipe system or other steel structure. Alternating currents very rarely cause corrosion. The corrosion resulting from stray currents (external sources) is similar to that from galvanic cells (which generate their own current) but different remedial measures may be indicated. In the electrolyte and at the metal-electrolyte interfaces, chemical and electrical reactions occur and are the same as those in the galvanic cell; specifically, the corroding metal is again considered to be the anode from which current leaves to flow to the cathode. **Soil and water characteristics affect the corrosion rate** in the same manner as with galvanic-type corrosion."
- "However, **stray current strengths** may be **much higher** than those produced by galvanic cells and, as a consequence, **corrosion may be much more rapid**. Another

difference between galvanic-type currents and stray currents is that the latter are more likely to operate over long distances since the anode and cathode are more likely to be remotely separated from one another. Seeking the path of least resistance, the stray current from a foreign installation **may travel along a pipeline causing severe corrosion where it leaves the line**. Knowing when stray currents are present becomes highly important when remedial measures are undertaken since a simple sacrificial anode system is likely to be ineffectual in preventing corrosion under such circumstances."

ORNL

Oak Ridge National Laboratory is science and technology laboratory managed by UT-Battelle, LLC for the U.S. Department of Energy. In 1997, they published a technical report on the siting and design of HVDC power transmission electrodes. See relevant excerpts below. [9]

- "HVDC transmission lines injecting current into the soil through their ground electrode(s) are a source of stray current interference. Any buried electrically conducted structure can be affected by stray current with the current entering and exiting at one or more locations. Typical structures which may be affected are Telecommunication and CATV cables; Coaxial and fiber optic cables; Concentric cable neutrals; Structure reinforcing bars; Metallic support hardware; Grounding systems; Power system tower footings; Water, sewer, or communication systems; and Buried pipelines."
- "HVDC transmission lines are a cause of ground current injection when operated in the monopolar or unbalanced bipolar modes. Monopolar mode transmission lines inject the total load current into the ground electrode one hundred per cent of the time … Disruptive effects to equipments are generally proportional to the instantaneous injected current. However, corrosion effects are proportional to the time integration of the injected current. For example, corrosion of a steel structure progresses at the rate of 20 pounds metal loss per amp-year of interference current leaving the structure, i.e., one amp of current for ten years is equivalent to ten amps of current for one year."
- "The spatial electric field developed as a result of the flow of current into the system electrodes, and therefore, into the earth is an important factor in determining the disruptive and corrosive effects to an object or structure attributable to the collocated dc transmission line. The extent of such effects is dependent upon the magnitude and direction of the electric field at the location of each collocated buried facility. Affected facilities and systems can include telecommunication and CATV cable, electric power transmission facilities such as cables, tower footings, and transformers, buried pipelines, and railroad tracks and signaling and communication systems."

Other

Academic Articles

- A 1999 article in an environmental studies journal discusses the pollution effects of stray current corrosion. The author states that "minimizing the hazardous interaction of stray currents connected with the functioning of a monopolar HVDC power line is based on application of earth (marine) electrodes of possibly low resistance. For the above reason they have large dimensions and they are located in an environment of low resistance. Bipolar systems should be used in such a way so that leakage of equalizing currents to the ground does not occur." [5]

- A 2003 conference paper advises that "if there are pipelines or other underground metal objects near the grounding installation, it is recommended that additional cathodic protection of such objects be provided to allow prevent rapid corrosion." [13]

Standards

- There is a **British standard** related to this topic - Protection against corrosion by stray current from direct current systems (BS EN 50162:2004) The standard "specifies the general principles to be adopted to minimize the effects of stray current corrosion caused by direct-current (d.c.) on buried or immersed metal structures." [*Note: Full-text not available without purchasing or obtaining through interlibrary loan*]. [12]

References

[1] California Department of Transportation. 2012. *Corrosion Guidelines Version 2.0.* Sacramento, CA: Caltrans. http://www.dot.ca.gov/hq/esc/ttsb/corrosion/pdf/2012-11-19-Corrosion-Guidelines.pdf

[2] Argonne National Laboratory Environmental Science Division. 2008. *The Design, Construction, and Operation of Long-Distance High-Voltage Electricity Transmission Technologies*. Argonne, IL: Argonne National Laboratory. Technical Memorandum ANL/EVS/TM/08-4. http://plainswindeis.anl.gov/documents/docs/APT_61117_EVS_TM_08_4.pdf

[3] NACE International. "Corrosion Wiki: Introduction to Stray Current Corrosion." Last accessed May 2, 2014. https://www.nace.org/StarterApps/Wiki/Dynamic.aspx?id=927&__taxonomyid=300

[4] U.S. General Accounting Office. 2008. *Transmission Lines: Issues Associated with High-Voltage Direct-Current Transmission Lines along Transportation Rights of Way.* Washington, DC: U.S. GAO. GAO-08-347R. http://www.gao.gov/products/GAO-08-347R

[5] Żakowski, K., and K. Darowicki. 1999. "Stray Currents and Pollution of the Environment." *Polish Journal of Environmental Studies* 8(4):209-212. http://www.pjoes.com/pdf/8.4/209-212.pdf

[6] Peabody, A. W. 1973. "Chapter 5. Corrosion Standards and Control in the Pipeline Industry." IN: Cocks, F. H. (ed.). *Manual of Industrial Corrosion Standards and Control.* Philadelphia, PA: American Society for Testing and Materials. ASTM STP 534. Copy available upon request.

[7] Beavers, J. A., and N. Thompson. 2006. "External Corrosion of Oil and Natural Gas Pipelines: Stray Current Corrosion." IN: *ASM Handbook. Vol. 13C Corrosion: Environments and Industries*. Materials Park, OH: ASM International, p. 1015–1025. Copy available upon request.

[8] Nicholson, Peter. 2010. *High Voltage Direct Current Interference with Underground/Underwater Pipelines*. NACE paper no. 10102. http://www.cath-tech.com/papers/nace-corrosion2010-10102.pdf

[9] Holt, Richard J., John Dabkowski, and Ronald L. Hauth. 1997. *HVDC Power Transmission Electrode Siting and Design*. Oak Ridge, TN: Oak Ridge National Laboratory. ORNL/Sub/95-SR893/3. http://www.osti.gov/scitech/servlets/purl/580585

[10] Parker, Marshall E. 1967. "High Voltage Direct Current: Pipeline Operators Fear HVDC Corrosion Damage." *Materials Performance* 6(8):23-24. Copy available upon request.

[11] Clean Line Energy Partners. 2014. "Transmission Line Structures." Last accessed May 6, 2014. http://www.grainbeltexpresscleanline.com/site/page/transmission-line-structures

[12] SAI Global. 2014. "EN 50162:2004." Last accessed May 7, 2014. http://infostore.saiglobal.com/store/details.aspx?ProductID=377861

[13] Koshcheev, L. A. 2003. "Environmental Characteristics Of Hvdc Overhead Transmission Lines." Prepared for the Third Workshop on Power Grid Interconnection in Northeast Asia, Vladivostok, Russia, September 30 - October 3, 2003. http://www.nautilus.org/wp-content/uploads/2011/12/Koshcheev_paper_final1.pdf

[14] U.S. Federal Highway Administration. 2009. *Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes.* Washington, DC: FHWA. FHWA-NHI-09-087. http://www.fhwa.dot.gov/engineering/geotech/pubs/nhi09087/nhi09087.pdf

[15] U.S. Federal Highway Administration. 1999. *Ground Anchors and Anchored Systems.* Washington, DC: FHWA. Geotechnical Engineering Circular no. 4. FHWA-IF-99-015. http://www.fhwa.dot.gov/engineering/geotech/pubs/if99015.pdf

[16] U.S. Federal Highway Administration. 2009. "Chapter 10 - Tunnel Lining." IN: *Technical Manual for Design and Construction of Road Tunnels - Civil Elements.* Washington, DC: FHWA. FHWA-NHI-10-034. http://www.fhwa.dot.gov/bridge/tunnel/pubs/nhi09010/10.cfm

[17] Bertolini, Luca, Bernhard Elsener, Pietro Pedeferri, Elena Redaelli, & Rob B. Polder. 2013. *Corrosion of Steel in Concrete: Prevention, Diagnosis, Repair.* 2nd ed. Weinheim, Germany: Wiley-VCH. Google Books preview

[18] NACE. 2014. "TG 356 - Reinforced Concrete: Stray-Current-Induced Corrosion." http://www.nace.org/cstm/Technical/Directory/Committee.aspx?id=1dc97447-60ef-db11-9194-0017a4466950/. Last accessed May 28, 2014.

Sources Consulted

Library Catalogs	WorldCAT MOBIUS
Library Databases	EBSCO Academic Search Complete, Academic Search Elite, Academic Search Premier, Business Source Premier, eBook Academic Collection (EBSCOhost), Environment Complete, MasterFILE Premier, Newspaper Source, Regional Business News ASCE Digital Library ASM Handbooks ASTM SEDL - Digital Library Compendex IEEE Xplore NTIS SciTech Connect TRID
Websites	AASHTO Corrosion Analysis Network Electric Power Research Institute (EPRI) Google, Google Books Grain Belt Express NACE International National Transportation Library Digital Repository State DOT Custom Search Engine U.S. Federal Highway Administration
Internal Resource	Literature Search Archive