ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 1

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

Having heard the testimony some of the above entities provided to the Energy Committee, could you provide further comment on the following areas:

a. In your opinion, what were the primary causes of the electric power shortage in Arkansas during the February winter event? What mitigation strategies were in place to deal with the electric power shortage experienced during the February winter event?

b. Given that existing strategies appeared to mitigate the severity of the electric power outages, what additional strategies could be employed to further enhance the ability to provide sufficient electric power to Arkansas in the future? Other than an extreme weather event, are there events which could impact the electric power availability and result in inadequate electric power availability?

c. What additional strategies, regulations, protocols and or polices should be developed by industry or government to insure Arkansas has an adequate electric power supply?

RESPONSE:

1a. The Southwest Power Pool (SPP) region experienced extreme cold temperatures during the unprecedented February 2021 winter storm event. These extreme conditions resulted in extremely high February demand for electricity. It has been widely publicized that these temperatures led to freezing conditions which interrupted gas supply across the SPP footprint during this time of extreme demand, and in turn caused many gas-fired units to be curtailed or forced into an outage situation due to limited fuel supply. While SWEPCO's generation fleet is comprised of varied sources, including renewable generation, natural gas and coal, the extreme conditions also adversely impacted SWEPCO's solid-fuel generation, as unit operations were impacted by equipment and instrumentation that were disabled due to harsh conditions. Across the 14-state SPP region, resource diversity also played a key role in mitigating the potential

impact of the winter storm event. In addition, the SPP over time has done a good job of managing the reserve margin.

From a Transmission Operator perspective, AEP Transmission Operations worked closely with SPP before and during the event to execute operating instructions aimed at adjusting the load on the Transmission System in order to maintain stability. The actions taken during the event are included in the annual System Operator capacity deficiency training conducted by SPP and AEP. This training provides the System Operators with an understanding of the actions that need to be taken in a capacity deficiency event.

The mitigation strategies that were in effect at the time of the winter weather event are those strategies that SWEPCO is required to maintain at all times by NERC and SPP. The various operating levels required are set out in the table below.

BALANCING AUTHORITY (BA) ALERT LEVELS

Alert levels defined by SPP operating plans

Normal Operations	SPP has enough generation to meet demand, has available reserves and does not foresee extreme or abnormal reliability threats
Weather alert	SPP expects extreme weather in its reliability coordination service territory
Resource alert	SPP's BA area expects severe weather conditions, significant outages, wind-forecast uncertainty and/or load-forecast uncertainty with potential to impact total capacity.
Conservative Operations	SPP determines the need to operate system conservatively to avoid an emergency based on weather, environmental, operational, terrorist, cyber or other events
Maximum emergency generation notification	SPP foresees the need to use emergency ranges of resources for a certain hours.

Alert levels defined* by NERC EOP-011-1

Energy Emergency Alert (EEA) Level 1	**All available generation resources in use** • All generation is committed, and there is concern about maintaining required reserves for BA • Non-firm wholesale energy sales curtailed.
EEA Level 2	**Load management procedures in effect** • BA is no longer able to provide its expected energy requirements and is energy deficient • Operating plan implemented, including public appeals and demand response • BA is still able to maintain minimum reserves • Market participants and other BAs notified • Transmission limitations evaluated and revised • BA makes use of all available resources
EEA Level 3	**Firm load interruption imminent or in progress** • BA is unable to meet minimum contingency reserve requirements • System & reliability limits revaluated and revised • Immediate action taken to mitigate undue risk to the Interconnection, including load shedding.

* These are paraphrased, summarized definitions. Full definitions: https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-011-1.pdf

SPP 4

A thorough explanation of the utilization of Energy Emergency Alerts can be found at https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-011-1.pdf

SWEPCO Distribution has on file a load shed plan that defines which breakers are to be opened. The shedding of this load helps to mitigate the impact of the capacity deficiency and help avoid a cascading event. See Attachment 1 for a timeline of the SPP Notices to SWEPCO, and SWEPCO Notices to Customers, during the winter weather event.

1b. From an equipment perspective, gas-fired generating units would benefit if additional precautions were taken in the natural gas industry to protect against extreme weather, to ensure continuous supply. Any significant disruption in the supply of natural gas during a period of high demand, whether such disruption is weather related or otherwise, could yield similar results to those we saw during the winter event. We have done much to improve our plant equipment, but we could provide further winterization protections based on experience with this most recent severe weather event to further fortify generating assets. Examples include the construction of new enclosures and upgrades to heat trace systems at the generating plants.

1c. Natural gas is consumed as it is delivered. With dependency on natural gas as a fuel for electric generation, it is imperative that gas supply be available during times of crisis. Further winterization of equipment by the natural gas industry would provide additional security of supply.

Defined protocols or policies to promote increased load transfer capabilities between regional transmission organizations would provide additional import capacity to support SPP or MISO customers, located in Arkansas, during extreme capacity deficiency events.

In addition to extreme weather events, cybersecurity events and insider threats have the potential to impact electric power availability for the industry as a whole. In this context, cybersecurity refers to cybersecurity of operational technology and informational technology that is used to manage the Bulk Electric System. Insider threats would include individuals with direct access to operational technology, informational technology, or physical access to Bulk Electric System infrastructure. AEP actively works to mitigate threats from cybersecurity events as well as insider threats.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 2

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

With respect to the current electric generation capacity mix, what steps can be implemented to ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

RESPONSE:

As a whole, the SWEPCO system, generation, transmission, distribution, and customer communications operated in conjunction with the SPP to mitigate adverse customer impacts during the winter storm, under unprecedented conditions. SWEPCO's existing generating facilities have been designed and maintained to operate in such conditions. Nonetheless, additonal review of the causes of the unplanned unit derates and outages during the winter event will identify additional steps to ensure sufficient generation to serve peak load during extreme winter events.

With regard to the Company's ability to ensure natural gas supply to its natural gas generating units, the Company could increase the amount of natural gas supplied through monthly baseload or long-term contracts (fixed price and volume), but that does not ensure delivery during a major weather event (as producers and marketers can claim force majeure if warranted by the conditions). Such changes would also likely increase fuel costs to customers.

Natural gas is consumed as it is delivered, thus a sudden disruption in supply, whether weather related or otherwise, can have a negative impact on spot prices and supply availability. If conditions prevent natural gas from being produced or made available to consumers, prices will increase and the curtailment of generating units could be required.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)
TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 3
DATE REQUESTED: **April 9, 2021**
DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

With respect to planned changes in the electric generation capacity mix over the next decade, what steps will ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

RESPONSE:

The Company is committed to providing highly reliable energy to its customers. The Company is part of the SPP RTO and works with SPP and its members to ensure continued, highly reliable energy services are provided to its members. Furthermore, the Company is continuing to study various alternatives impacting the electric generation capacity and energy mix through its IRP process and in collaboration with SPP and its members. Resiliency of the grid and availability of generation resources during extreme events, including but not limited to extreme temperatures, hurricanes, tornados and ice storms, will continue to be an area of focus by SWEPCO and its stakeholders.

SWEPCO's existing generating facilities have been designed and maintained to operate in extreme conditions. The solid fuel units have adequate fuel inventory and well established sources and delivery options. The natural gas units often have multiple fuel suppliers and one is equipped with fuel oil inventory to operate when natural gas supplies are limited, and three units are equipped as "Black Start" units. The North Central Wind units are including a winterization package to support extreme winter operations. Furthermore, for capacity planning purposes, intermittent resources including wind and solar are allocated a fraction of the "nameplate" capacity for capacity planning purposes.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 4

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

Are there reasonably available storage solutions for electricity that could be implemented in the state? What are the barriers or impediments to deployment of storage technologies? Are there uses for these storage solutions during day-to-day operations in addition to providing backup during extreme peaking events, so as to reduce the cost to value ratio?

RESPONSE:

Generally, energy storage resources are available but at a higher cost than traditional energy sources and provide limited resiliency. Finding unique opportunities on the grid to deploy this technology versus more conventional approaches typically provides the greatest benefit. The unique nature of this technology does allow it to provide extremely fast response to system events. The industry and the Company continue to develop an understanding of opportunities to deploy this technology in an efficient manner.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 5

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

What changes would you suggest integrated system operators consider to their dispatch process to allow for increasing generation for the purposes of holding electricity in storage (e.g., pump storage or battery) in advance of a forecasted extreme weather event? Are there constraints or impediments in place that would prevent implementation of such changes?

RESPONSE:

As a result of FERC Order 841, the SPP RTO is already making changes to its systems to better facilitate the integration of storage resources in the Integrated Marketplace. However, it is important to realize that the volume of storage resources in the SPP Market today is very limited. Storage facilities will have limited additional benefit in an extreme weather event until the storage capacity is much larger, meaning peak MW of delivery, and/or the volume of energy delivered is improved.

One design element that will need additional work in the SPP systems is managing the daily energy limits of storage resources. The real time market systems simply dispatch resources based on price throughout the day without specifically reserving the energy stored in the battery for the peak period in the day. The impediment in place is simply that it takes time to design, receive approval for, and build such market systems.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 6

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

To what extent did implementation of energy efficiency programs by the utilities in accordance with Public Service Commission rules reduce the need to shed load during the February weather event? Are there changes to the energy efficiency rules, targets, or Energy Office programs that should be made to put downward pressure on electricity and natural gas heating demand through increased energy efficiency?

RESPONSE:

While the energy efficiency programs offered by SWEPCO do result in some demand savings by participating customers, the majority are focused on peak savings which historically occur during the summer months. SWEPCO does not currently offer demand response programs in its Energy Efficiency portfolio, outside of the Load Management program which runs during the summer. Therefore, we did not have the ability to proactively control the water heaters or heating systems through smart thermostats of residential customers, nor did we have commercial customers equipped for quick response load reduction.

In addition to the energy efficiency programs, SWEPCO has an Experimental Curtailable Service Rider which allows a customer to choose to have some portion of their demand designated as curtailable kW. These customers helped SWEPCO reduce the amount of firm load we had to curtail by approximately 17 MW. The non-firm load customers were curtailed prior to the curtailing of the firm load. Without these customers, SWEPCO would have had to curtail an additional 17 MW of firm load, such as residential customer service, during the winter weather event.

The current Arkansas Public Service Commission Rules for Conservation and Energy Efficiency Programs, targets and programs are sufficient. No changes are warranted at this time as a result of the extreme winter weather event.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 7

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

Describe your preparedness and allocation process for critical energy resources during extreme events.

RESPONSE:

The inventory target for the SWEPCO coal generation plants (Plants) is to have 30 days of coal available at full load burn. Having inventory available on hand allows for potential plant, supply and transportation disruptions. The purchasing strategy is to purchase coal on a total SWEPCO basis in advance and make available for delivery at all times. Contracting on a total SWEPCO basis provides for the flexibility to move deliveries between the Plants. Additionally, SWEPCO transports coal under transportation agreements to the Plants with the Union Pacific Railroad which also provides the flexibility to divert unit trains between Plants on an as needed basis. This inventory and purchasing/transporting strategy allows SWEPCO to be ready in extreme, unexpected events.

From a natural gas procurement perspective, SWEPCO maintains firm natural gas transportation agreements for a portion of its fleet to ensure reliable deliveries during periods of high demand. Furthermore, SWEPCO is also a party to a long-term, fixed price natural gas supply agreement.

From a renewable energy perspective, SWEPCO is not the operator of some of its existing wind resources, which are available via purchase powr agreements, and therefore does not have as much control over their operation. With the completion of SWEPCO's pending North Central Wind Facilities, more capacity can be realized as an operator of the system. Regarding renewable resources in general, while wind and solar generation do not have stored fuel, neither are their power sources subject to interruption from competition with other needs (e.g., heating load) or other types of disruption. Their intermittent nature is largely accounted for by developing a statistically grounded capacity value.

ARKANSAS ENERGY RESOURCES PLANNING TASK FORCE (ERPTF)

TESTIMONY QUESTIONS

ELECTRIC UTILITIES

SOUTHWESTERN ELECTRIC POWER COMPANY

ERPTF – Question No. 8

DATE REQUESTED: **April 9, 2021**

DATE OF RESPONSE: **May 7, 2021**

INFORMATION REQUESTED:

Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?

RESPONSE:

In the event of emergency curtailment (load shed), customers are notified through a multitude of ways including company statements to news media; social media posts; commercial, industrial and wholesale account contacts; and text/emails for customers enrolled in outage alerts. End users wishing to appeal or request consideration of unique circumstances would contact a Customer Services & Marketing representative or the Customer Solutions Center.

Southwestern Electric Power Company
Energy Resources Policy Task Force
Question 1a
Attachment 1

Notices from SPP to SWEPCO:

2/9/2021 at 0:00 AM: In response to the cold weather, SPP declares a period of conservative operations effective until further notice.

2/15/2021 at 0:00 to 5:00 AM: SPP's preemptive request that member companies issue appeals for public conservation goes into effect.

2/15/2021 at 5:00 AM: SPP declares an Energy Emergency Alert (EEA) Level 1, meaning that all available resources have been committed to meet obligations, and SPP is at risk of not meeting required operating reserves.

2/15/2021 at 7:22 AM: SPP declares an EEA Level 2 which requires SPP to ask its member companies to issue public conservation appeals, serves as a maximum emergency generation notification for resources, and informs the market that emergency ranges of any resources may be required.

2/15/2021 at 8:05 AM: SPP instructs AEP to initiate non-firm curtailment of interruptible customers.

2/15/2021 at 10:08 AM: SPP declares an EEA Level 3 when SPP is forced to begin relying on required reserve energy. This means SPP was carrying reserves below the required minimum and had initiated assistance through the Reserve Sharing Group.

2/15/2021 at 12:06 PM: SPP instructs AEP to shed 101 MW of firm load. SWEPCO is instructed to shed 58 MW.

2/15/2021 at 12:10 PM: While still under EEA Level 3 and after exhausting reserves, SPP directs member utilities to implement controlled, temporary interruptions of service.

2/15/2021 at 1:01 PM: SPP advises that all firm load shed can be restored.

2/15/2021 at 2:00PM: SPP declares a return to EEA Level 2, restoring load to the region with enough generation to meet demand and minimum reserve requirements.

2/15/2021 at 2:25 PM: SPP advises that curtailable load can be restored.

2/15/2021 at 6:51 PM: SPP instructs AEP to initiate non-firm curtailment of interruptible customers.

2/16/2021 at 12:07 AM: SPP advises curtailable load can be restored.

2/16/2021 at 3:21 AM: SPP instructs AEP to initiate non-firm curtailment of interruptible customers.

2/16/2021 at 6:15 AM: SPP declares an EEA Level 3. System-wide generating capacity had dropped below current load of approximately 42 gigawatts (GW) due to extremely low temperatures, inadequate supplies of natural gas and wind generation. SPP directs member utilities to implement controlled, temporary interruptions of service.

2/16/2021 at 6:46 AM: SPP instructs AEP to shed 227 MW of firm load. SWEPCO is instructed to shed 130 MW.

2/16/2021 at 7:18 AM: SPP instructs AEP to shed 227 MW of firm load. SWEPCO is instructed to shed 130 MW.

2/16/2021 at 9:33 AM: SPP advises that AEP can restore 227 MW of firm load. SWEPCO is able to restore 132 MW.

2/16/2021 at 10:07 AM: SPP has restored all load, meaning SPP has enough generating capacity available to meet system-wide demand. SPP remains in an EEA Level 3, indicating SPP is still operating below required minimum reserves.

2/16/2021 at 10:08 AM: SPP advises that AEP can restore remaining 227 MW of firm load.

2/16/2021 at 11:30 AM: SPP returns to EEA Level 2 until further notice, restoring load to the region with enough generation to meet demand and minimum reserve requirements.

2/16/2021 at 12:00 PM: SPP advises that curtailable load can be restored.

2/16/2021 at 12:31 PM: SPP downgrades to an EEA Level 1. While no longer an Energy Deficient Entity, all available resources are committed to meet obligations, and SPP

remains at risk of not meeting required operating reserves.

2/16/2021 at 6:28 PM: SPP declares an escalation to EEA Level 2. SPP directs its member companies to issue public conservation appeals. The alert will remain in effect until further notice. At this time, SPP has enough generating capacity online to meet system-wide demand, but is taking steps to mitigate the risk of outages.

2/16/2021 at 6:33 PM: SPP instructs AEP to initiate non-firm curtailment of interruptible customers.

2/17/2021 at 12:47 PM: SPP advises that curtailable load can be restored.

2/17/2021 at 1:15 PM: SPP downgrades to an EEA Level 1. While no longer an Energy Deficient Entity, all available resources are committed to meet obligations, and SPP remains at risk of not meeting required operating reserves.

2/17/2021 at 6:20 PM: SPP declares an escalation to EEA Level 2. SPP directs its member companies to issue public conservation appeals. The alert will remain in effect until further notice.

2/17/2021 at 6:20 PM: SPP instructs AEP to initiate non-firm curtailment of interruptible customers.

2/17/2021 at 9:40 PM: SPP advises that curtailable load can be restored.

2/17/2021 at 10:59 PM: SPP downgrades to an EEA Level 1. While no longer an Energy Deficient Entity, all available resources are committed to meet obligations, and SPP remains at risk of not meeting required operating reserves.

2/18/2021 at 9:30 AM: SPP downgrades from EEA Level 1 to a conservative operations status. Due to continuing high loads and other severe cold weather implications, it will remain in a period of conservative operations until 10 PM, February 20, for the entire SPP balancing authority area.

2/18/2021 at 6:25 PM: SPP declares an EEA Level 1, meaning that all available resources have been committed to meet obligations, and SPP is at risk of not meeting required operating reserves.

2/19/2021 at 9:20 AM: SPP downgrades from EEA Level 1 to a conservative operations status. Due to continuing high loads and other severe cold weather implications, it will remain in a period of conservative operations until 10 PM, February 20, for the entire SPP balancing authority area.

2/20/2021 at 10:00 PM: SPP returns to normal operations for the entire SPP balancing authority area, signaling it has enough generation to meet demand and available reserves and foresees no extreme or abnormal threats to reliability.

Notices from SWEPCO to Customers:

2/14/2021 at approximately 5:45 PM: SWEPCO issues an Emergency Appeal to Conserve Energy informing the public that SWEPCO was experiencing an increased demand for electricity due to the extreme cold, and requesting that SWEPCO customers reduce their electricity use. This Emergency Appeal was issued via the news media, on SWEPCO.com, and on SWEPCO's Facebook and Twitter pages.

2/15/2021 at approximately 12:20 PM: SWEPCO issues a Curtailment Initiation Announcement informing the public that some SWEPCO customers would experience an interruption in electric service on a rolling basis for no longer than a few hours, to the extent possible. This Initiation Announcement was issued via the news media, on SWEPCO.com, and on SWEPCO's Facebook and Twitter pages.

2/16/2021 at approximately 7:00 AM: SWEPCO issues a Curtailment Initiation Announcement informing the public that some SWEPCO customers would experience an interruption in electric service on a rolling basis for no longer than a few hours, to the extent possible. This Curtailment Initiation Announcement was issued via the news media, on SWEPCO.com, and on SWEPCO's Facebook and Twitter pages.

ENERGY RESOURCES PLANNING TASK FORCE

TESTIMONY QUESTIONS
Please send your responses to ERPTaskForce@adeq.state.ar.us on or before April 30, 2021.

ELECTRIC UTILITIES - Responses of Entergy Arkansas, LLC

1. Having heard the testimony some of the above entities provided to the Energy Committee, could you provide further comment on the following areas:

• In your opinion, what were the primary causes of the electric power shortage in Arkansas during the February winter event? What mitigation strategies were in place to deal with the electric power shortage experienced during the February winter event?

ANSWER: The primary cause of the electric power supply / demand imbalance during the week of February 15, 2021 was the extreme weather event that affected a significant part of the United States, including Arkansas. The extreme winter weather event during the week of February 15, 2021, presented challenges at many levels for the state of Arkansas and the state's electric utilities, including Entergy Arkansas. Fortunately, our electric system in Arkansas performed well, and, service interruptions were limited in number and duration. Our employees and those of the other electric utilities worked tirelessly to ensure that customers in Arkansas had electric service. The extreme winter conditions and the associated high demand for electricity and natural gas resulted in an imbalance between supply and demand. The relationship between supply and demand was extremely tight. This was compounded by a winter weather event that affected a significant portion of the country at one time.

This weather event has caused historically high usage and demand for electricity statewide and throughout the region. By way of example, Entergy Arkansas's peak demand on February 15, 2021 was approximately 4,198 MW, which is the second highest monthly winter peak since the company joined MISO in 2013. By way of comparison, the demand on July 29, 2015, the highest summer demand since joining MISO, was 4,665MW. And of the top 15 highest hourly winter peaks since joining MISO, nine of these peaks came in February 2021. Having high usage and demand during a winter event creates additional challenges. During the summer, there is not a competing demand for natural gas for space heating. During this event, the demand for natural gas has been high both for electric generation as well as for space heating and other direct uses. Further, during the cold weather, there are challenges for the natural gas industry that their representatives can better address. Consequently, the winter high demand situation has caused real challenges for the industry (like everything else in 2020 and 2021).

Entergy Arkansas implemented the mitigation strategy of regular communication with our customers and requests for our customers to conserve electricity during the winter weather event. Throughout the week, we worked to encourage conservation by our customers to avoid service interruptions due to the high demand on the system. We used a variety of tools to convey those messages, including calls, texts, emails, broadcast and print media, and social media. Our customers responded to those requests, and that certainly helped limit the number and duration of outages during the winter weather event. Most of the outages faced by Entergy Arkansas'

customers were associated with a coordinated outage called by the Midcontinent Independent System Operator (MISO) that is described in greater detail below. Our customers also experienced a limited number of other outages that were scattered across the state. Although the outages were limited in number and duration, we recognize that, to the customers who experienced an outage, those events did not seem minimal.

Another mitigation strategy and a very real benefit to Arkansas that served as a contributing factor in the state's ability to weather the storm is our diverse fuel mix for electric generation. Entergy Arkansas benefits from generating resources that include nuclear, coal, natural gas, hydro and solar. Without the significant investments to build, acquire, operate, maintain, and improve these generating facilities, the impact of the extreme winter weather would likely have been greater. During the winter weather event, we drew upon each of our state's fuel sources. The extreme cold weather presented challenges to our system. However, because of the diversity of the fuel mix, we were able to keep the lights on and power flowing with only limited interruption.

Our investment in transmission infrastructure also served to mitigate the impact of the winter weather event. Entergy Arkansas is the largest transmission owner in the state. Over the last several years, we have made significant, strategic investments in the transmission system. These investments have made our transmission network in Arkansas more reliable and resilient. Additionally, the other electric utilities have also invested in their transmission networks. These investments have strengthened the system and have helped withstand the challenges presented by the current extreme conditions and serve to ensure reliable electric service every day. Without the investments to build, operate, maintain and improve these facilities, the impact of this winter weather event would likely have been more significant.

Entergy Arkansas further mitigated the impact of the winter storm event through our significant investments in our distribution system. These investments have further strengthened the ability to respond to the challenges presented by the winter weather. Not only have we installed new facilities, we have also maintained and upgraded our existing facilities. We continue to invest in technological improvements that modernize and improve our distribution system. By way of example, Entergy Arkansas is in the process of installing advanced meters throughout our system. These meters will provide more detailed information to the Company to help improve our operations, including during extreme weather events. Customers also will have more timely information about their usage and can take steps to manage their usage and their bills, which can be affected significantly by extreme weather events. The advanced meters also help us more efficiently identify outages on our system when they occur. We are also making other improvements throughout our distribution networks to provide better information and to allow the systems to operate more reliably and efficiently. Without these investments to build, operate, maintain, and improve these facilities, the impact of the winter weather event would likely have been more significant.

Entergy Arkansas further mitigated the impact of the winter weather event through its membership in the MISO Regional Transmission Organization (RTO). As a member of MISO, Entergy Arkansas is interconnected with other utilities throughout the region. Other electric

utilities in Arkansas are members of either MISO or the Southwest Power Pool (SPP) RTO. Because the extreme weather event affected the entire regions served by both MISO and SPP, the ability of the member utilities to draw upon each other's resources was limited. However, the interconnected nature of the transmission systems within and connecting the RTOs did prove beneficial. In contrast, the areas of Texas served by ERCOT are not generally interconnected with other areas and were largely unable to draw upon any resources outside of the ERCOT footprint. Further, the areas of Texas that lie in the ERCOT footprint generally have retail open access and are not served by vertically integrated electric utilities. These ERCOT utilities thus rely in large part on the competitive market to bring about investment in adequate generation resources to serve customers. That is a significant difference from the electric utility market in Arkansas where customers are served by vertically integrated, regulated public utilities, electric cooperatives, and municipal electric utilities. Here in Arkansas, the adequacy of generation resources to serve customers' needs, including during extreme events, is addressed not through competitive markets but by vertically integrated, regulated public utilities engaging in integrated resource planning under the regulatory oversight of the Arkansas Public Service Commission.

During a weather event, Entergy Arkansas can interrupt customers who are served under interruptible rate schedules, consistent with the terms of each rate schedule. The interruptible rate schedules are intended to provide needed capacity at times of scarcity, including during an extreme weather event. Entergy Arkansas can call on customers seeking to curtail those customers to free up capacity to serve its remaining customers whose rate schedules require firm service. Entergy did call upon its customers served under interruptible rate schedules to curtail their consumption during the winter weather event.

Additionally, the MISO and SPP RTOs also employed the mitigation strategies of calling for coordinated interruptions of service to maintain the reliability of the bulk electric system and to prevent damage and prolonged outages. As mentioned above, most of the outages experienced by Entergy Arkansas' customers during the winter weather occurred during the coordinated outage called by MISO. During the week of February 15, these coordinated outages were limited in number and duration and helped ensure reliable operation of the system throughout the extreme weather event. As reported in a number of sources, both MISO and SPP called upon the utilities to interrupt customers to maintain the reliability of the grid. MISO called for the interruption of customers on the southern portion of its grid, which includes Entergy Arkansas, on Tuesday evening at approximately 6:45 pm, and it instructed that all load could be restored at 9:00 pm. The Company interrupted approximately 60,000 customers in groups of approximately 20,000 in rolling, intermittent outages that lasted between 30 and 45 minutes for any individual customer with an average duration of less than 40 minutes. The news reports indicate that other utilities were also called upon to interrupt customers, and their representatives can address their experiences. MISO and SPP operate the transmission systems of numerous utilities over large regions of the country. They act, in part, to ensure the reliability of the transmission system and to help prevent widespread outages that can also damage the electric grid. The transmission system operator, in extreme circumstances and as a last resort, will call upon utilities to interrupt customer load to help protect the system.

• Given that existing strategies appeared to mitigate the severity of the electric power outages, what additional strategies could be employed to further enhance the ability to provide sufficient electric power to Arkansas in the future? Other than an extreme weather event, are there events which could impact the electric power availability and result in inadequate electric power availability?

ANSWER: During the winter weather event, each fuel source experienced challenges that were either caused by or exacerbated by the extreme cold temperatures and the imbalance of supply and demand. Entergy Arkansas is continuing to evaluate its experience during the winter weather event to identify potential opportunities to improve the reliability and resilience of its system. The mitigation strategies employed by Entergy Arkansas during the winter weather event as described in the response above enabled the Company to respond to imbalances in electric energy supply and demand whether caused by extreme weather events. The Company continues to evaluate the experience from the winter weather events.

Imbalances in the supply of and demand for electric energy of the magnitude of those that occurred during the week of February 15, 2021 are likely going to be weather driven such as extreme heat or cold. Other factors that could contribute could be failure of or damage to a significant portion of the electric utility system. Again, those occurrences are generally related to weather related events such as storms or extreme hot or cold temperatures.

• What additional strategies, regulations, protocols and or polices should be developed by industry or government to insure Arkansas has an adequate electric power supply?

ANSWER: The events of the week of February 15, 2021 were certainly among the most extreme conditions ever experienced by Entergy Arkansas and the other electric and natural gas utilities in the state and region. In spite of those challenges, the number and duration of the outages experienced by Entergy Arkansas' customers were limited. During the winter weather event, each fuel source experienced challenges that were either caused by or exacerbated by the extreme cold temperatures and the imbalance of supply and demand. Entergy Arkansas is continuing to evaluate its experience during the winter weather event to identify potential opportunities to improve the reliability and resilience of its system. The mitigation strategies employed by Entergy Arkansas during the winter weather event as described in the response above enabled the Company to respond to imbalances in electric energy supply and demand whether caused by extreme weather events. The Company continues to evaluate the experience from the winter weather events.

Entergy Arkansas' electric generating facilities managed through the inclement weather in February relatively well from an environmental perspective. While this was the case during February's power emergency, the likelihood for experiencing environmental compliance issues during this type of event is considerably higher. With the potential for incurring environmental issues being elevated, it remains imperative that Entergy Arkansas and the other electric utilities in Arkansas continue to maintain unit reliability during power emergencies so that load demand can be met for the safety and well-being of our customers and the communities we serve.

Entergy Arkansas prioritizes the safety and well-being of its customers even in cases where it might be in opposition to the environmental performance of a power generating facility. While it is rare that these objectives would work in opposition with one another, Entergy Arkansas urges the Arkansas Department of Environmental Quality (ADEQ) to consider implementing a policy or a procedure for requesting enforcement discretion for these types of occasions where there may be reliability issues for meeting electric demand. Should ADEQ wish to review a program which is already in place, the Texas Commission on Environmental Quality has implemented a procedure where the Reliability Entity (for Entergy Arkansas, this is MISO) is able to request enforcement discretion with respect to potentially having an environmental exceedance or violation. Entergy Arkansas works diligently to maintain environmental compliance and takes all factors into consideration, having such a policy or procedure in place would better allow for Entergy Arkansas' plant management teams to focus on unit reliability under these dire circumstances.

2. With respect to the current electric generation capacity mix, what steps can be implemented to ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

ANSWER: The electric utilities under the jurisdiction of the Arkansas Public Service Commission are required to file resource plans every three years. The resource plans examine the available generating resources, the existing and anticipated electric loads of each utility, the expected growth in demand for electricity, and the resources needed in the future to meet the expected load. The electric utilities in Arkansas have demonstrated the ability to effectively plan and meet the needs for generating capacity in Arkansas. As noted above, Arkansas benefits from a diverse mix of generating resources. The utilities have indicated their intention to continue to maintain a portfolio of generating resources that includes diverse fuel resources. Maintaining a diverse mix of resources is a key mitigation strategy to being prepared to provide safe and reliable electric utility service at reasonable rates. As noted above, a diverse mix of resources enables Arkansas' electric utilities to be prepared to respond to extreme weather events and any other imbalance of supply and demand that may arise in the future.

3. With respect to planned changes in the electric generation capacity mix over the next decade, what steps will ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

ANSWER: See the response to question 2.

4. Are there reasonably available storage solutions for electricity that could be implemented in the state? What are the barriers or impediments to deployment of storage technologies? Are there uses for these storage solutions during day-to-day operations in addition to providing backup during extreme peaking events, so as to reduce the cost to value ratio?

ANSWER: Currently, there do not appear to be any large-scale storage technologies that are available to cost effectively provide adequate capacity to support electric loads in Arkansas for an extended period. Entergy Arkansas will continue to monitor those developments and will likely include deployment of those as part of their future resource planning.

The Arkansas Public Service Commission has authorized Entergy Arkansas to acquire the Searcy Solar facility that is currently under construction near Searcy. That facility includes a ten megawatt battery storage system. That facility should help provide experience and information operating a generating facility with storage in Arkansas. Additionally, the hydroelectric generating facility at Lake DeGray, operated by the U.S. Corps of Engineers, has a limited amount of pumped storage capacity. As noted above, there are not adequate storage technologies available to cost effectively provide adequate capacity to support electric loads in Arkansas for an extended period.

5. What changes would you suggest integrated system operators consider to their dispatch process to allow for increasing generation for the purposes of holding electricity in storage (e.g., pump storage or battery) in advance of a forecasted extreme weather event? Are there constraints or impediments in place that would prevent implementation of such changes?

ANSWER: See the response to question 4.

6. To what extent did implementation of energy efficiency programs by the utilities in accordance with Public Service Commission rules reduce the need to shed load during the February weather event? Are there changes to the energy efficiency rules, targets, or Energy Office programs that should be made to put downward pressure on electricity and natural gas heating demand through increased energy efficiency?

ANSWER: The energy efficiency programs offered by Entergy Arkansas represent a resource available to meet the needs of the electric utility customers. Entergy Arkansas includes the energy efficiency programs in its resource plan submitted to the Arkansas Public Service Commission every three years. Reduction in consumption and demand generally contributed to the ability to weather the storm during the week of February 15, 2021. I do not have specific recommendations to the energy efficiency programs.

7. Describe your preparedness and allocation process for critical energy resources during extreme events.

ANSWER: See the responses to questions 1 and 2 above.

8. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?

ANSWER: See the response to question 1 above. Entergy Arkansas attempts to provide customers with as much advance notice of any call for curtailment or interruption of service. Under the operating procedures of MISO, there may be times when its call for interrupting customers does not provide sufficient time for advance notice to customers. However, the MISO

operating procedures do provide notification in advance that an interruption may happen on a given day, and the Company can provide advance notice to customers of the need to conserve and the possibility of interruption as it did during the winter weather event. In the curtailment or interruption of service, Entergy Arkansas attempts to identify human needs customers such as hospitals, nursing homes, and assisted living facilities.

ENERGY POLICY NETWORK

In coordination with
Mike Nasi, J.D., Jackson Walker, LP
Brent Bennett, Ph.D., Life:Powered

Response to:

ENERGY RESOURCES PLANNING TASK FORCE TESTIMONY QUESTIONS

April 28, 2021

ELECTRIC UTILITIES

Having heard the testimony some of the above entities provided to the Energy Committee, could you provide further comment on the following areas:

In your opinion, what were the primary causes of the electric power shortage in Arkansas during the February winter event?

Answer

Arkansas should be aware of the Regional Transmission Organizations (MISO, SPP), whose primary role is to keep the lights on in Arkansas during severe weather.

All indications point to a regional problem concerning the shortages. Arkansas's two Regional Transmission Organizations (MISO, SPP) were both experiencing shortages during the February polar vortex. It is reported that MISO was contracting for power from as far away as PJM on the east coast.

The primary reason both MISO and SPP were experiencing power shortages is simple: while Arkansas hasn't closed a baseload power plant in over a decade, utilities in both MISO and SPP have rushed to close baseload *dispatchable* power plants.

FACT: In the past five years:

- ✓ MISO - utilities have closed **45** baseload power plants (29 coal-fueled, 15 natural gas, 1 nuclear) for a total of **17,379 MW** of electric generating capacity.
  *Equivalent to the average electricity needed to power **11.2** million homes*

- ✓ SPP – utilities have closed **15** baseload power plants (7 coal-fueled, 7 natural gas, 1 nuclear) for a total of **4,738 MW** of electric generation.
  *Equivalent to the average electricity needed to power **3.0** million homes*

In my view, the primary cause for the power shortage in February is Arkansas's contractual ties with two RTOs that have collectively closed **60 baseload power plants (over 22,000 MW) in the past five years**. These baseload power plants were replaced with ***'intermittent'*** generating sources that cannot be relied on during extreme weather events.

(Excel spreadsheet of MISO and SPP plant closures - attached)

FACT: Oklahoma's Governor Kevin Stitt echoed the need for dispatchable and resilient capacity to manage extreme weather event. Speaking to the press regarding the near collapse of the SPP grid during the recent cold spell, Governor Stitt stated that "coal was really bailing us out".

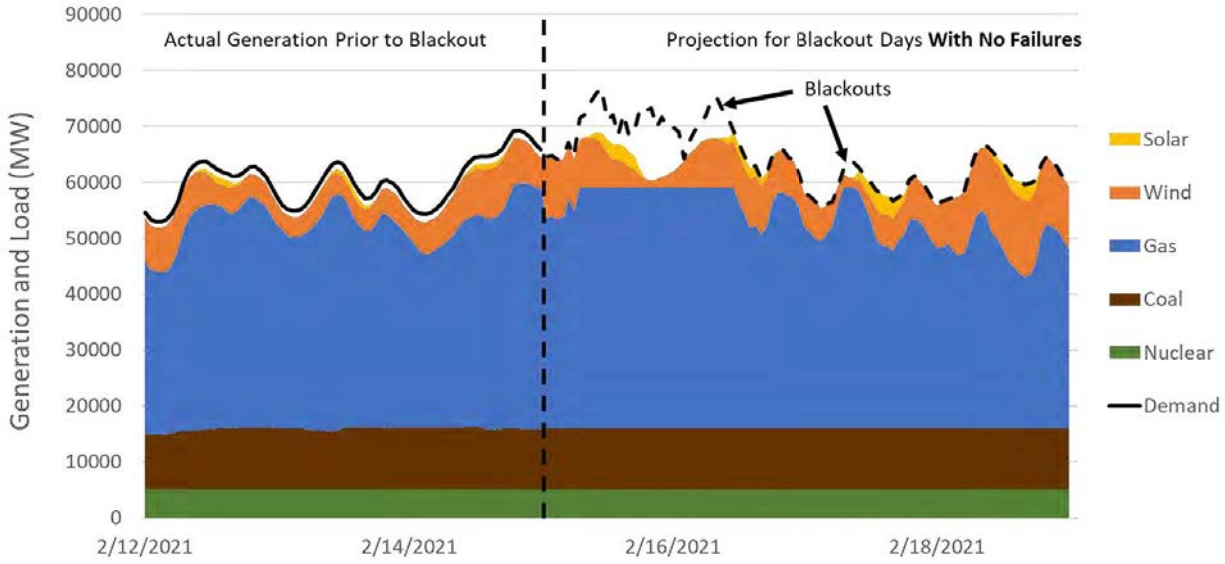
> "Renewable sources like wind and solar dropped to almost zero production. Natural gas wells froze and compressor stations went offline. That left utility companies really scrambling to buy extra energy on the spot market at skyrocketing prices. [...] Wind is normally about 40 percent and it dropped to 10 percent. Coal in Oklahoma is normally 10 percent and it went to 40 percent. I've talked to several other Governors that coal was really bailing us out in the production."
>
> Oklahoma Governor Stitt Press Conference
> February 22, 2021
> Oklahoma City, Oklahoma
> **Reference link:** https://www.youtube.com/watch?v=mCJD5AyDMOs

FACT: in the last three years, ERCOT utilities closed **6 coal-fueled** power plants **(6,233 MW)** of generation. In addition, over the past five years, ERCOT utilities shutdown **7 natural gas** plants **(3,122 MW)** of baseload generation. Combined, these baseload plants provide enough electricity to power over 6 million homes.

The effect of Winter Storm Uri on Texas is perhaps the most dramatic example of the problems caused by premature retirements of baseload coal and gas in favor of intermittent resources. Many parties have attempted to argue that more coal and gas generation would not have been necessary if the weather problems experienced by the existing generators had not occurred. That narrative is false.

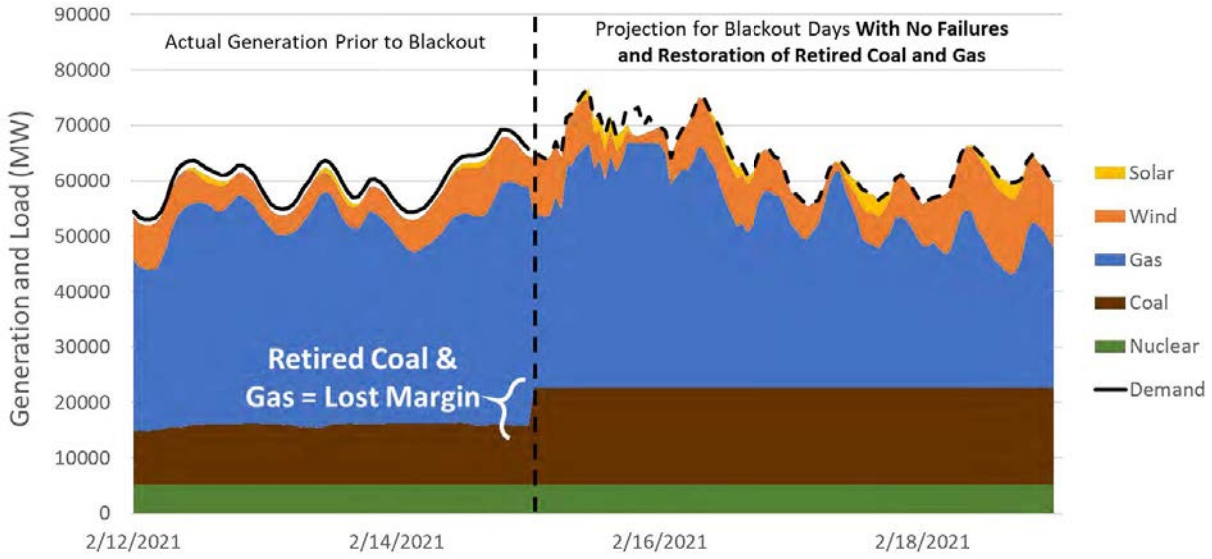
If the amount of generation outages the night of February 14th, which were normal for February, had been maintained throughout the event (no additional weather failures), the market would have likely been short for over 24 hours. Even if all the existing generation in ERCOT had been operational (all current coal, natural gas, nuclear, wind & solar generation) at 100 percent, there would have still been periods of at least a few hours where demand exceeded supply.

This can best be demonstrated by the graph below.



Source: Energy Information Administration Hourly Grid Monitor
For more information, visit lifepowered.org.

Adding back 7.5 GW of premature retirements would have reduced the outages to a few hours. Those power plants could have made an unmanageable problem far more manageable.



Source: Energy Information Administration Hourly Grid Monitor
For more information, visit lifepowered.org.

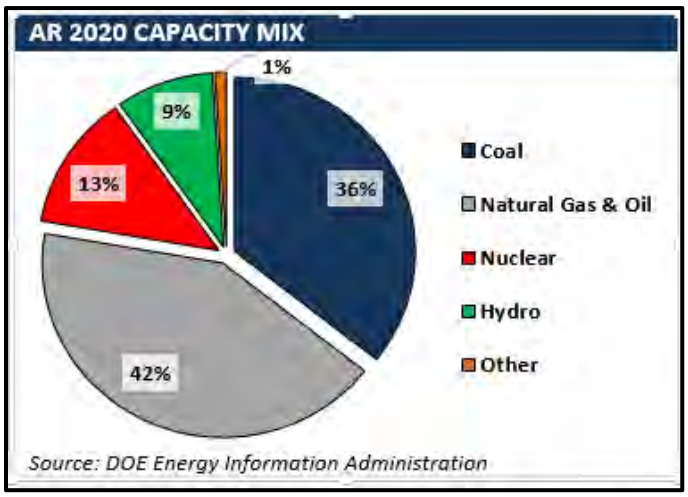
What additional strategies, regulations, protocols or polices should be developed by industry or government to ensure Arkansas has an adequate electric power supply?

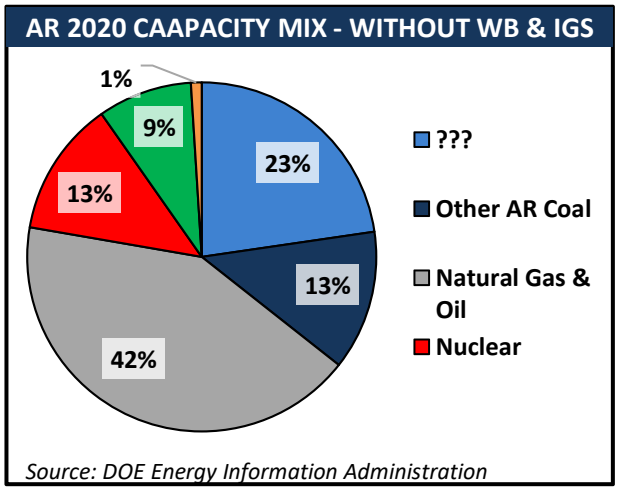
Answer

FACT: Currently there are three power plants scheduled to close by 2030 (White Bluff – coal, Independence – coal, Lake Catherine – natural gas). These three power plants

represent **23 percent** of the electric generating capacity of the state. There could very well be more announcements of closures of baseload *dispatchable* plants before 2030.

(See pie charts below)





The three suggested actions listed below should ensure adequate power supply.

1) Existing baseload *dispatchable* generation should remain in operating reserve.

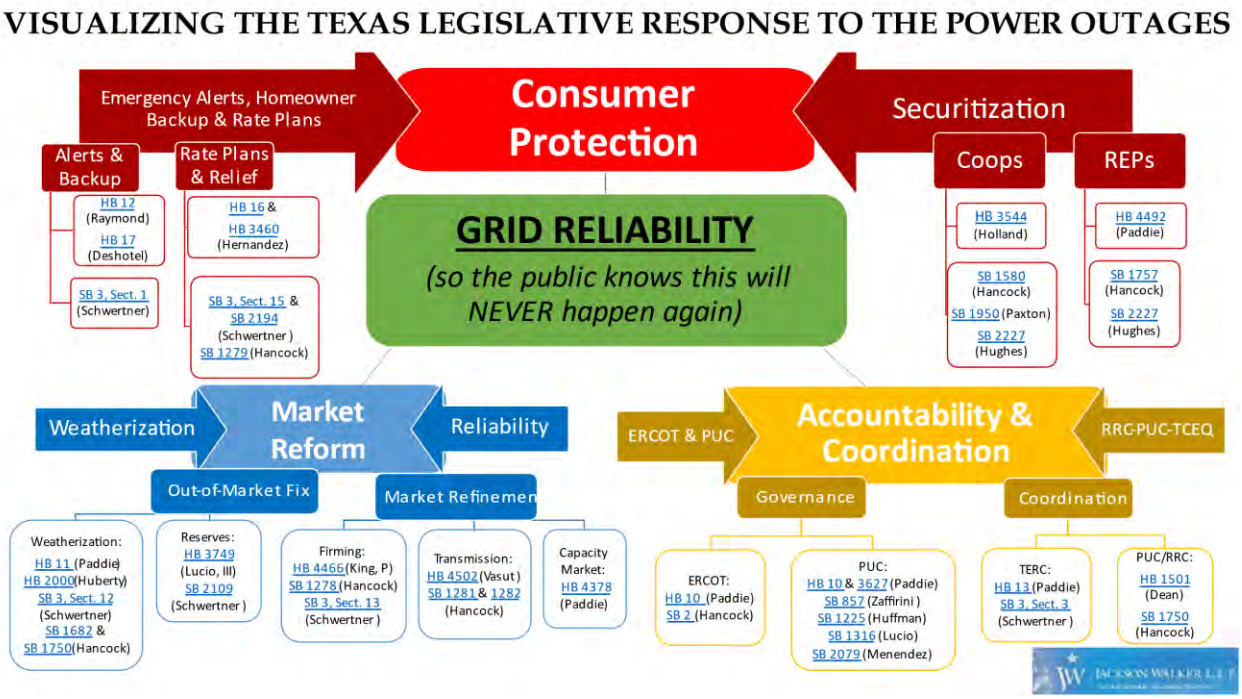
   a) It will cost to keep the baseload plants on standby, but given the cost to the Arkansas economy of the past February outages and a potential loss of life, the PSC could work with the utilities to find the most economical way to keep the plants in operation during the six months (three months during the summer, three months during the winter) of most severe weather.
   b) Even if one coal-plant were left in operation (operating reserve) it would provide enough power (1,600 MWs) for 1 million households.

2) Since Arkansas is a net exporter of power, providing a regulatory directive to the RTOs that Arkansas citizens take priority in times of extreme weather events.

   a) In situations of extreme weather, Arkansas should implement a reliability standard through the stakeholder process at SPP and MISO. Such a stakeholder process would address market rules that develop a sufficient amount of dispatchable generation to over demand during extreme weather periods.
   b) SPP and MISO are required to factor in state laws and policies in market protocols. Regulations by the APSC could place reliability checks on electricity flowing from Arkansas utilities into both MISO & SPP. Just as these RTOs are required to factor in state renewable energy portfolio standards, they would be required to incorporate these reliability standards.

3) Legislation has been introduced in six states (IN, MT, ND, TX, WY, WV) that require all new *intermittent* sources of power generation to be backed with a firm purchase power contract to become a *dispatchable* resource. Texas has introduced 43 bills addressing Securitization, Accountability, Market Reform and Emergency Alerts. The most comprehensive of these is SB 3.

The bill mandates that all intermittent power sources in the ERCOT system show verifiable firm purchase-power agreements from *dispatchable* power sources. Such firm capacity contracts are targeted for only times of the highest net load periods (demand – wind output – solar output). These are the times when demand on thermal generators is the highest and when reliability is most at risk. Arkansas should consider passing a law that requires large 'utility scale' projects to provide a firm contract for *dispatchable* power during periods of peak power.



With respect to the current electric generation capacity mix, what steps can be implemented to ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

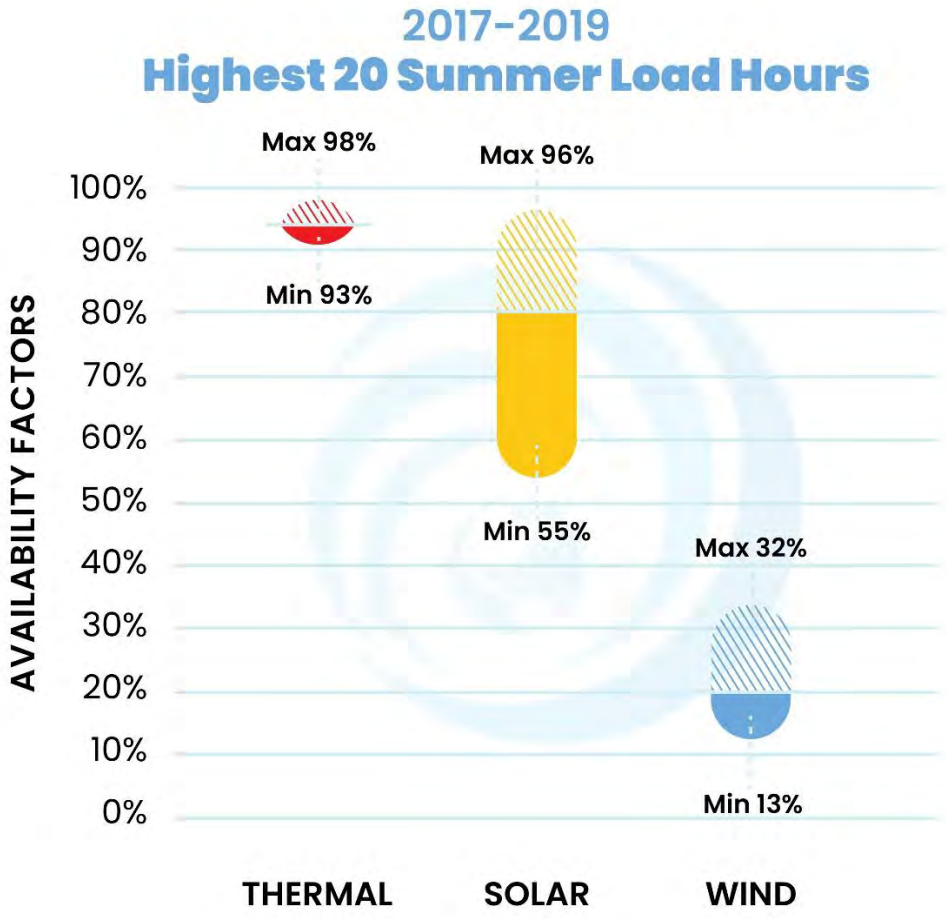
Answer

Currently Arkansas has a diversified electric generation mix. With **91 percent** of Arkansas generation coming from baseload (coal, nuclear, natural gas) units. But as the chart below depicts, if the two large coal plants close (White Bluff -2028/Independence-2030) it will remove **23 percent** of the current baseload capacity.

If this 23 percent baseload is replaced with *intermittent* resources by 2030, Arkansas's electric generation mix would have **33 percent *intermittent* power**. In order to fully understand the difference between dispatchable capacity and variable renewable capacity, one need only look at their performance during peak demand periods.

Texas (ERCOT) is currently 35 percent *intermittent* power by installed capacity and therefore provides an example of the expected performance of intermittent generators

on a large scale. During the highest summer load hours, the availability factor of thermal generators is always better than 90%, varying from 93% to 98%. While solar has a high resource availability during the summer, it is highly variable, ranging from less than 60% to more than 95%. Wind varies from 13% to 32%. Therefore, any market design must account for this high variability by ensuring adequate dispatchable power and ancillary services are available to make up for wind and solar shortages.



Source: ERCOT, http://www.ercot.com/gridinfo/generation

As stated in response to the previous question, there are three suggestions for "ensuring that the mix can provide sufficient generation to serve peak loads…"

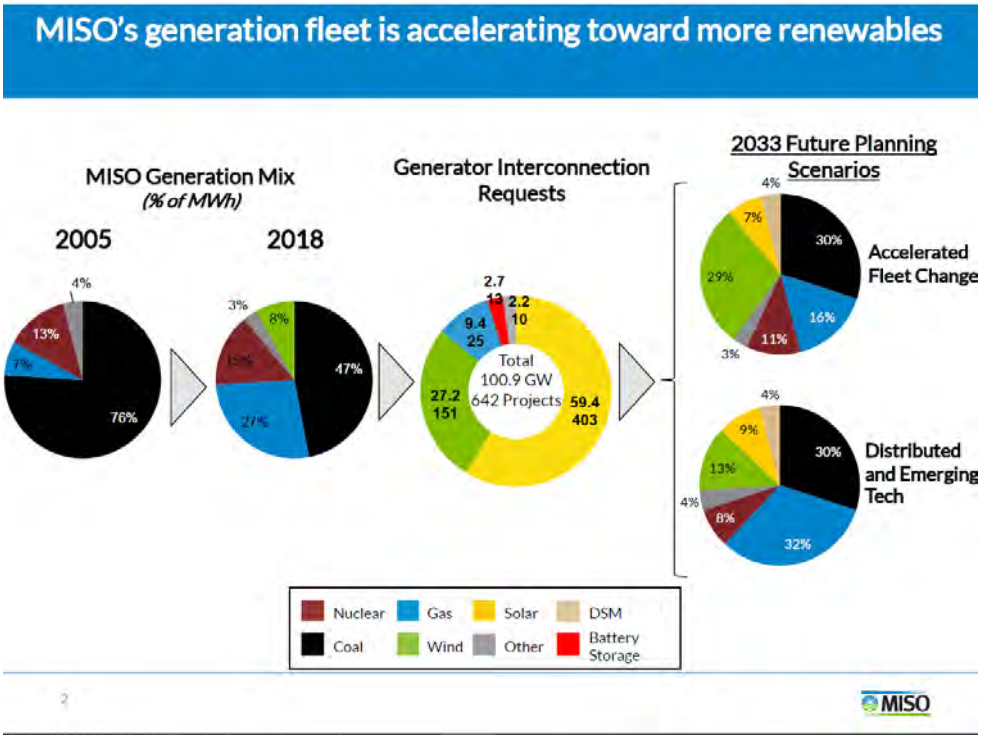
1) Existing baseload *dispatchable* generation should remain in operating reserve. There should be a financial incentive to the utilities, for continuing to operate *(at a low level)* power plants that are uneconomical.
2) Provide a regulatory directive to the RTOs that in times of extreme weather events, utilities located in Arkansas must place a priority on the safety and security of Arkansans.
3) Require all new utility-scale *intermittent* sources serving Arkansas to be backed with a firm purchase power contract for baseload *dispatchable* power.

With respect to planned changes in the electric generation capacity mix over the next decade, what steps will ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

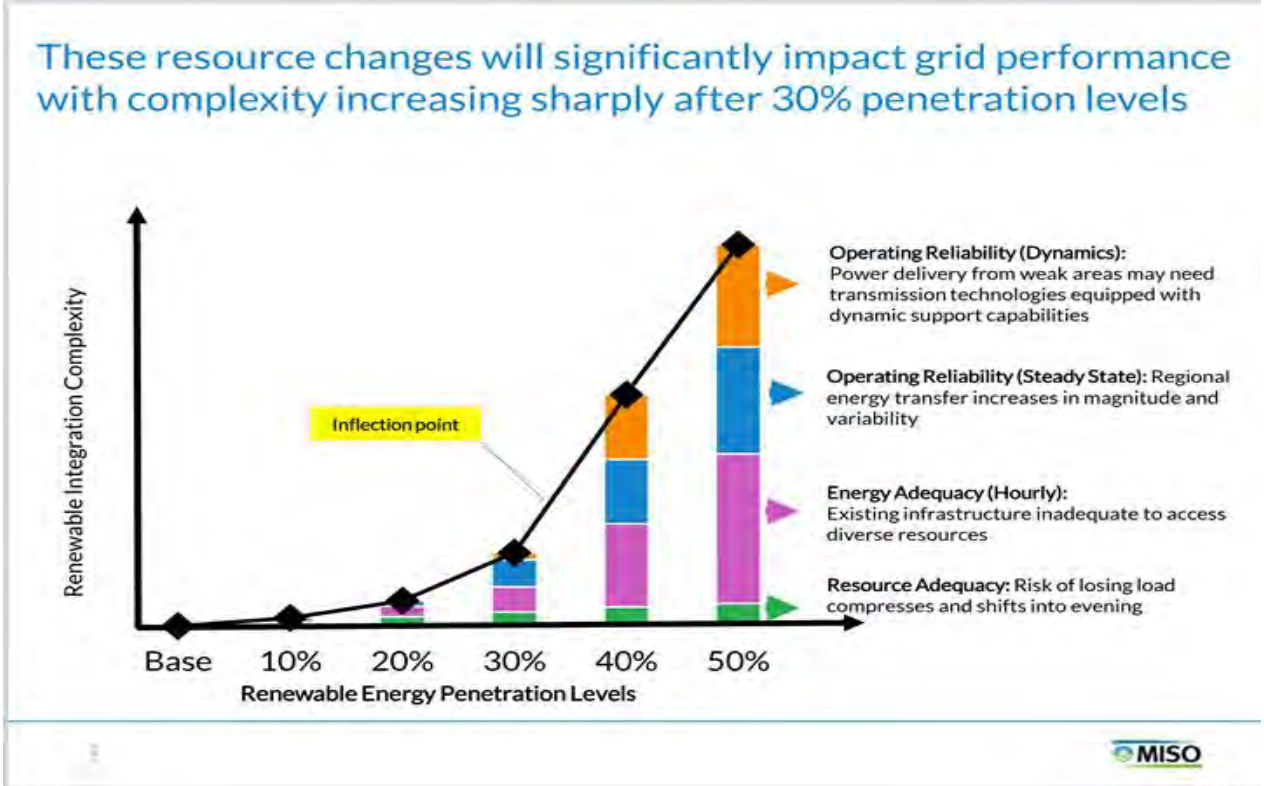
Answer

Arkansas currently has a very good electric generation mix. When you have 91 percent of your power coming from baseload plants, reliability should not be a problem. The problem for Arkansas lies in the actions of other states within MISO and SPP. As the chart below depicts, in 2018, MISO had 89 percent of its generation in baseload power plants.

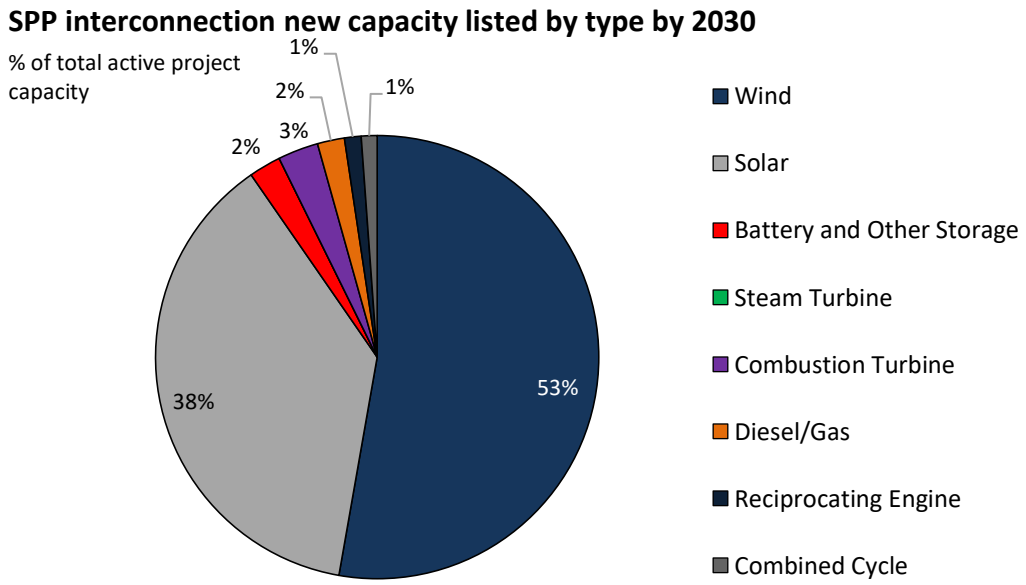
FACT: Since 2018, MISO has closed **6,631 MW** of baseload power (nuclear, coal, natural gas). In times of severe weather**, the closures in MISO and SPP can affect Arkansas.** Additionally, utilities within MISO and SPP plan to replace this baseload generation with ***intermittent*** power. As depicted in the graph below, some **88 percent** of new energy projects in the queue in MISO are wind and solar.



As the pie chart on the right of the chart above depicts, MISO could be 36% *intermittent* power by 2033. MISO itself admits that there will be a significant problem when the region reaches 30% *intermittent* power. Chart below. Keep in mind ERCOT is currently 35% *intermittent* generation by installed capacity and is quickly approaching 30% annual generation from those sources. It's not a coincidence that ERCOT is beginning to experience systemic problems from intermittent generation at a level that is close to where MISO was predciting problems would occur



SPP's future generation is even more telling. Some **91 percent** of new projects in SPP's interconnection queue are *intermittent* power.



Source: Energy Ventures Analysis

The reason for the rapid movement to *intermittent* power are based on two key factors.

- One is the lower cost of wind and solar. Federal and state subsidies make renewable energy marketably more attractive than baseload plants.
  (These subsidies are not expected to end. If anything they will become larger.)

- The second reason for the continued growth is the political pledges that have been made by governors, mayors and fortune 500 companies.
    a. These pledges run on the low end – carbon nutral by 2050
    b. To the high end – 100 percent renewable energy by 2040

  In order to maintain reliability, there are ways to become carbon neutral without closing needed baseload plants.

One such solution is to operate them on a seasonal bases and defining specific baseload units as '***emergency access***' units, while giving the utility a financial incentive to keep the plants with a constant fuel supply operational. Coal plants should be required to have a 30 day supply of fuel at all times.

As suggested in answers to the two prior questions, my thoughts on how best meet your question of; ***"over the next decade, what steps will ensure that the mix can provide sufficient generation to serve peak load …,*** are as follows:

1) Existing baseload *dispatchable* generation should remain in **operational reserve. T**here should be a financial incentive to the utilities for continuing to operate *(at a lower level)* power plants that are uneconomical.
2) Provide an Arkansas regulatory directive to the RTOs that states, **'in times of extreme weather events, utilities located in Arkansas must place a priority on the safety and security of Arkansans'.**
3) Require all new utility-scale *intermittent* sources serving Arkansas to be **backed with a firm purchase power contract for baseload *dispatchable* power.**

Are there reasonably available storage solutions for electricity that could be implemented in the state? What are the barriers or impediments to deployment of storage technologies? Are there uses for these storage solutions during day-to-day operations in addition to providing backup during extreme peaking events, so as to reduce the cost to value ratio?

Answer

There are currently many existing energy storage technologies in operation on electric grids worldwide, primarily pumped hydroelectric storage and numerous kinds of batteries. Lithium-ion batteries are dominating the list of planned projects primarily because those projects can piggyback their economies of scale with electric vehicle battery production. However, other technologies are being developed specifically for utility-scale energy storage, including liquid metal batteries and various kinds of flow batteries that use very stable liquid electrolytes. There is even research into using retired fossil fuel electric generating units for thermal energy storage.

The challenge is not finding technologies that work but reaching the required levels of cost and scale for different applications. Deploying 1-2 GW of energy storage across a system to manage frequency variations, counteract sudden losses of large generators, and assist with ramping is already being done in markets such as PJM and CAISO. These short-duration uses are well suited for energy storage. Intraday storage of solar or wind

energy, shifting energy from early afternoon or late evening to the highest demand periods in the late summer afternoons, is also becoming more common as prices fall and greater scale is reached. These types of projects are being built in many markets across the Southwest U.S. to reduce the price volatility caused by changes in demand and renewable production and to help ensure resource adequacy.

The real scaling challenges come into play when energy storage is needed to replace power from dispatchable power plants in areas with high penetrations of wind and solar. A simplified way of showing how far energy storage is from this capability is to compare the cost to store the output of a 500 MW power plant over 5 hours. This comparison is generous in that most replacement scenarios require well over a day of energy storage, even with significant overbuilds of wind and solar. In a fossil fuel power plant, the coal and gas acts as a form of very inexpensive energy storage, storing enough energy to produce 2,500 MWh of electricity a cost of $30-40,000. The capital cost of a comparable Li-ion battery at current prices is about $600 million, for a per-cycle cost (assuming a 2,000-cycle life for the battery) of about $300,000. **In other words, battery costs need to fall at least 10 times to enable high renewable penetration and to even begin to offset the retirement of baseload generation.**

Furthermore, the scale of energy storage needed to achieve high renewable penetration is many times greater than anything that exists today. Using the ERCOT market in Texas as an example, achieving 50% wind and solar penetration (ERCOT is currently at about 25%) and meeting demand growth between now and 2030 requires maintaining almost all its existing thermal generation while also adding over 10 GW of energy storage. That amount of energy storage is comparable to what was operating on electric grids *worldwide* in 2019.

Moving beyond 50% wind and solar requires either maintaining a significant amount of backup capacity or a substantial expansion of energy storage. The model below maintains backup generation up to 80% penetration, so the 100% scenario indicates what would be needed if energy storage was exclusively relied on to manage wind and solar variability, approaching 1 TW (and far more than 1 TWh) of capacity, or 100 times what exists in the world today. And that is just for the Texas market.

	2018	Current Policies	50 Percent Renewables	80 Percent Renewables	100 Percent Renewables
Wind Capacity (MW)	22,066	37,596	49,877	102,928	107,737
Solar Capacity (MW)	1,861	11,019	25,372	86,091	91,597
Battery Capacity (MW)	87	527	10,626	23,260	533,833
Nuclear Capacity (MW)	4,960	4,960	4,960	4,960	-
Gas capacity (MW)	45,449	51,997	54,700	42,000	-
Coal Capacity (MW)	14,225	14,225	-	-	-

Source: Life:Powered

> In summary, the problem with using energy storage on the grid is not one of technology but of scale. Nothing in the existing energy storage development pipeline is capable of achieving the levels of cost and scale required to replace baseload generation. Given the 10 to 20-year development timeline for battery technologies, achieving high levels of renewable penetration is not something that is physically or economically conceivable for Arkansas over the next couple of decades. If Arkansas is going to utilize more intermittent generation, it *must* ensure the continued existence of adequate baseload generation and backup power to support reliability needs.

Our expertise is in generation, not in energy efficiency and demand side management, so we will not comment on the remaining questions. Our primary comment is that demand side management is helpful but not sufficient to maintain system reliability and resilience in the absence of significant dispatchable thermal generation.

Balancing Authority Code	MISO

Sum of Net Summer Capacity (MW)	Column Labels					
Row Labels	**2016**	**2017**	**2018**	**2019**	**2020**	**Grand Total**
All Other			6			6
Conventional Hydroelectric	6		5		6	17
Conventional Steam Coal	3,865	389	2,667	2,918	1,017	10,855
Landfill Gas	5	5	12	10		32
Municipal Solid Waste			1	98		99
Natural Gas Fired Combined Cycle	95	48		76	87	306
Natural Gas Fired Combustion Turbine	47	59	236	204	366	912
Natural Gas Internal Combustion Engine	3	7	13	6	13	42
Natural Gas Steam Turbine	2,607	692	1,368	207	47	4,920
Nuclear					601	601
Onshore Wind Turbine	22		1	2		25
Other Waste Biomass	2		1	3	2	8
Petroleum Coke	85					85
Petroleum Liquids	43	111	250	18	9	430
Wood/Wood Waste Biomass			61	149	38	249
Grand Total	**6,780**	**1,311**	**4,622**	**3,691**	**2,185**	**18,588**

Balancing Authority Code	SPP

	Sum of Net Summer Capacity (MW)	Column Labels			
	Row Labels	**2016**	**2017**	**2018**	**2019**
	Conventional Hydroelectric				1
	Conventional Steam Coal	1,218	125	806	
BL	Landfill Gas	1		2	
	Natural Gas Fired Combustion Turbine	13	10		55
	Natural Gas Internal Combustion Engine	5	3	4	13
BL	Natural Gas Steam Turbine	52	73	793	16
	Nuclear	483			
	Onshore Wind Turbine		30		8
BL	Petroleum Liquids	3	5	2	7
	Grand Total	**1,775**	**247**	**1,608**	**100**

2020	Grand Total	
	1	
848	2,997	BL
	4	
8	86	
1	26	
325	1,258	BL
	483	
10	48	
1	18	
1,193	**4,921**	

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April 28, 2021

Arkansas Department of Energy & Environment
Energy Resources Planning Task Force
Secretary Becky Keogh
5301 Northshore Drive
North Little Rock, AR 72118

via email: ERPTaskForce@adeq.state.ar.us

RE: Response to Testimony Questions
Electric Utilities

Dear Secretary Keogh:

Thank you for the opportunity to provide pre-filed testimony to the Energy Resources Planning Task Force. The February winter storms highlighted the need to evaluate Arkansas' critical energy resources and infrastructure, to evaluate the preparedness of those resources and infrastructure, and how to plan for resiliency and reliability of those resources and infrastructure for future extreme events. Generally, two components associated with grid architecture are impacted by a severe weather event – resilience and reliability. Resilience is the ability to withstand stress without operational compromise to the grid or the ability to adapt to that stress without sustained outage. Reliability is what happens once the grid is broken. Fortunately, in the February winter storms Arkansas' utilities never experienced a resilience issue and certainly never approached reliability concerns.

In the interest of providing the clearest response to the requested testimony, I have set out the questions and answers below.

ELECTRIC UTILITIES

1. Having heard the testimony some of the above entities provided to the Energy Committee, could you provide further comment on the following areas:

• In your opinion, what were the primary causes of the electric power shortage in Arkansas during the February winter event? What mitigation strategies were in place to deal with the electric power shortage experienced during the February winter event?

ANSWER: *The primary cause of the supply / demand imbalance during the week of February 15, 2021 was the extreme weather event that affected a significant part of the United States, including*

Arkansas. The extreme winter weather event during the week of February 15, 2021, presented challenges at many levels for the state of Arkansas and prompted the associated high demand for electricity and natural gas, which resulted in an imbalance between supply and demand. The relationship between supply and demand was extremely tight. This was compounded by a winter weather event that affected a significant portion of the country at the same time.

A noteworthy mitigation strategy that benefited the customers of Arkansas' electric utilities is the membership of the utilities in the Midcontinent Independent System Operator ("MISO") and Southwest Power Pool ("SPP") regional transmission organizations ("RTO"). MISO and SPP operate the transmission systems of several utilities over large regions of the country. They act, in part, to ensure the reliability of the transmission system and to help prevent widespread outages that can also damage the electric grid. The transmission system operator, in extreme circumstances and as a last resort, can call upon utilities to interrupt customer load to help protect the system.

As RTO members, the electric utilities in Arkansas are interconnected with other utilities throughout the region. Because the extreme weather event affected the entire regions served by both MISO and SPP, the ability of the member utilities to draw upon each other's resources was limited. However, the interconnected nature of the RTOs proved beneficial. In contrast, the areas of Texas served by the Electric Reliability Council of Texas ("ERCOT") are not interconnected with other regions and were unable to draw upon any resources outside of the ERCOT footprint. Further, the areas of Texas that lie in the ERCOT footprint have retail open access and are not served by vertically integrated electric utilities. That is a significant difference from the electric utility market in Arkansas where customers are served by vertically integrated, regulated public utilities, electric cooperatives, and municipal electric utilities.

Another significant mitigation strategy that worked to address the imbalance between supply and demand is the diverse fuel mix in the portfolio of generating resources used by the electric utilities to serve their customers in Arkansas. Arkansas benefits from electric utilities with portfolios of generating resources that include nuclear, coal, natural gas, hydropower and solar. Although some solar resources generally did not contribute during this event, Arkansas' electric utilities were able to draw on other resources. Without the significant investments to build, acquire, operate, and

maintain these diverse generating facilities, the impact of the extreme winter weather would likely have been greater. During the winter weather event, the electric utilities drew upon each of the available fuel sources, and the diversity of the fuel mix allowed the utilities to keep the lights and heat on and power flowing with only limited interruption.

Another mitigation strategy that helped to address the challenges presented by the extreme weather event is investment in the transmission infrastructure in Arkansas. Entergy Arkansas is the largest transmission owner in the state. I am aware that over the last several years, Entergy Arkansas has made significant, strategic investments in its transmission system as have the other Arkansas electric utilities that own transmission assets, and I understand that these investments have made the transmission network in Arkansas more reliable and resilient. These investments have strengthened the system and have helped withstand the challenges presented by extreme conditions and serve to ensure reliable electric service every day. Again, as noted above, without the investments to build, operate, maintain, and improve these facilities, the impact of this winter weather event would likely have been more significant perhaps resulting in not just load shedding, but system failure.

Moreover, investments in the distribution systems of the electric utilities serving Arkansas have proven to be an effective mitigation strategy as demonstrated during the extreme weather event. These investments have further strengthened the ability to respond to the challenges presented by the winter weather. It is my understanding that not only have the electric utilities installed new facilities, they have also maintained and upgraded their existing facilities. The electric utilities continue to invest in technological improvements that modernize and improve their distribution systems. By way of example, Entergy Arkansas is in the process of installing advanced meters throughout its system as has Oklahoma Gas and Electric Company as well as several of the electric cooperatives. These meters provide more detailed and timely information to the utilities to help improve their operations. Their customers also will have more timely information about their usage, which enables them to better manage their usage and bills. The advanced meters also help the utilities more efficiently identify outages on their systems should they occur. The electric utilities are also making other improvements throughout their distribution networks to provide better information and to allow the systems to operate more reliably and efficiently. To emphasize, without these investments to build,

operate, maintain and improve these facilities, the impact of the winter weather event would likely have been more significant.

The electric utilities also employed a mitigation strategy of interrupting their customers who are served under interruptible rate schedules. The interruptible rate schedules are designed to provide needed capacity in a crisis situation such as an extreme weather event. The electric utilities can curtail those customers to free up capacity to serve the utilities' remaining customers whose rate schedules require firm service. Additionally, the MISO and SPP RTOs called for coordinated interruptions of service to maintain the reliability of the bulk electric system and to prevent damage and prolonged outages. During the week of February 15, these coordinated outages were limited in number and duration and helped ensure reliable operation of the system throughout the extreme weather event. As reported in a number of sources, both MISO and SPP called upon the utilities to interrupt customers to maintain the reliability of the grid. By way of example, Entergy Arkansas has noted that it was instructed by MISO to interrupt customers on Tuesday evening at 6:59 pm, with the last customers being restored at 8:59 pm. Entergy Arkansas interrupted approximately 60,000 customers in groups of approximately 20,000 in rolling, intermittent outages that lasted between 30 and 45 minutes for any individual customer with an average duration of less than 40 minutes. The news reports indicate that other utilities were also called upon to interrupt customers in a similar fashion. The ability of the MISO and SPP RTOs to work in a coordinated fashion, with operations centers here in Arkansas, is a significant advantage providing secure service and to minimizing the risk of system failure.

Finally, the electric utilities also employed a mitigation strategy of requesting conservation from their customers to help weather the storm. I am advised that, throughout the week, the utilities worked to encourage conservation by their customers to avoid service interruptions due to the high demand on the system. The utilities used a variety of tools to convey those messages, including calls, texts, emails, broadcast and print media, and social media. I'm sure you received emails or texts like I did in addition to hearing and seeing the news coverage. Fortunately, the electricity customers in Arkansas responded to those requests as we have seen Arkansans respond positively to emergencies so many times, which certainly helped limit the number and duration of outages during the winter

weather event. While outages were limited in number and duration as mentioned above, the utilities understand that to the customers who experienced an outage, those events did not feel minimal.

• Given that existing strategies appeared to mitigate the severity of the electric power outages, what additional strategies could be employed to further enhance the ability to provide sufficient electric power to Arkansas in the future? Other than an extreme weather event, are there events which could impact the electric power availability and result in inadequate electric power availability?

***ANSWER**: The mitigation strategies, which are expansive in scope as outlined in the response above, appear to be adequate to respond to imbalances in supply and demand whether caused by extreme weather events or other factors.*

It seems to be a reasonable proposition that imbalances in supply and demand of the magnitude of those that occurred during the week of February 15, 2021 primarily will be weather driven such as extreme heat or cold. Other factors that could contribute include failure of or damage to a significant portion of an electric utility system. Again, it may be expected that such occurrences generally will be related to weather related events such as storms. I think it is important to note that the electric utilities routinely manage through maintenance activities of generation facilities in such a way that interruptions in electric power availability do not occur. RTOs and the electric utilities work cooperatively to ensure that maintenance, even large-scale projects that take generating units offline for weeks at a time, does not result in inadequate electric power availability.

• What additional strategies, regulations, protocols and or polices should be developed by industry or government to insure Arkansas has an adequate electric power supply?

***ANSWER**: As demonstrated during the week of February 15, 2021, the mitigation strategies described above worked effectively to limit the number and duration of outages during the extreme weather event. The events of that week were certainly among the most extreme winter weather conditions ever experienced in the state and region. In spite of those challenges, the number and duration of the outages were limited.*

One additional strategy that Arkansas should consider is the development of a policy or procedure for requesting enforcement discretion for events that could impact electric power resiliency and reliability. The Texas Commission on Environmental Quality ("TCEQ") has a procedure available

to the RTO to request enforcement discretion with respect to potential violation under TCEQ jurisdiction. The intent of the TCEQ policy, which Arkansas could mirror, is to suspend certain Texas Administrative Code rules because they may prevent, hinder, or delay necessary actions needed to respond to an extreme weather event. As part of its response to COVID-19, the Arkansas Energy & Environment Department, Division of Environmental Quality exercised enforcement discretion so a similar response for extreme weather impacts would not be unprecedented. Because extreme weather events impact many areas of power generation facilities and supporting activities, a variety of requirements including those related to air, water and waste management would need to be subject to enforcement discretion. A multimedia approach is necessary to determine which Arkansas-specific rules may be subject to enforcement discretion, and I would be pleased to assist in identifying those rules.

2. With respect to the current electric generation capacity mix, what steps can be implemented to ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

ANSWER: *The electric utilities under the jurisdiction of the Arkansas Public Service Commission are required to file resource plans every three years. The resource plans examine the available generating resources, the existing and anticipated electric loads of each utility, the expected growth in demand for electricity, and the level of resources anticipated in the future to meet the expected load. This planning process enables the electric utilities to identify general resource needs and anticipated plans to meet those needs; the Commission's process also calls for competitive solicitations to be issued with respect to the identification of specific generating resources needed to meet that anticipated load. The electric utilities in Arkansas have demonstrated the ability to effectively plan and meet the needs for generating capacity in Arkansas. The utilities have indicated their intention to continue maintaining a portfolio of generating resources that is fuel diverse. Maintaining a diverse mix of resources is an important mitigation strategy in preparedness to provide safe and reliable electric utility service at reasonable rates. As noted above, Arkansas' diverse mix of resources enhances the ability of Arkansas' electric utilities to be prepared to respond to extreme weather events and any other imbalance of supply and demand that may arise.*

3. With respect to planned changes in the electric generation capacity mix over the next decade, what steps will ensure that the mix can provide sufficient generation to serve peak load during extreme weather events?

ANSWER: *See the response to question 2.*

4. Are there reasonably available storage solutions for electricity that could be implemented in the state? What are the barriers or impediments to deployment of storage technologies? Are there uses for these storage solutions during day-to-day operations in addition to providing backup during extreme peaking events, so as to reduce the cost to value ratio?

ANSWER: *Battery storage costs continue to decline. There are today certain battery storage applications, like the battery that I understand is being installed at Entergy Arkansas' Searcy Solar facility that make sense. However, currently, there do not appear to be any large-scale storage technologies that are readily available to cost effectively provide adequate capacity to support electric loads in Arkansas for an extended period. The utilities will continue to monitor those developments and will likely include deployment of those as part of their future resource planning.*

Pumped-storage hydropower is a type of hydroelectric energy storage that currently accounts for more than 90% of all utility-scale energy storage in the United States. Lake DeGray's dam is equipped with the capacity to "pump back" and, when brought on line in 1971, was the first dam with that capability in the Corps of Engineers' history. Pumped-storage could add day-to-day solutions when coupled with renewables and could provide some backup during extreme peaking events. While additional pumped-storage projects have been considered from time to time in Arkansas, the national regulatory climate for those projects seems to impose significant impediments to bringing a project to completion in a cost-effective manner.

5. What changes would you suggest integrated system operators consider to their dispatch process to allow for increasing generation for the purposes of holding electricity in storage (e.g., pump storage or battery) in advance of a forecasted extreme weather event? Are there constraints or impediments in place that would prevent implementation of such changes?

ANSWER: *See the response to question 4.*

6. To what extent did implementation of energy efficiency programs by the utilities in accordance with Public Service Commission rules reduce the need to shed load during the February weather event? Are there changes to the energy efficiency rules, targets, or Energy Office programs that should be

made to put downward pressure on electricity and natural gas heating demand through increased energy efficiency?

ANSWER: *Energy efficiency programs have been demonstrated to reduce overall demand but are generally implemented over a long period of time and, as such, probably did not directly influence the need to shed load beyond overall load reduction. While the energy efficiency programs represent a resource available to meet the needs of the electric utility customers, I do not have specific recommendations regarding those programs.*

7. Describe your preparedness and allocation process for critical energy resources during extreme events.

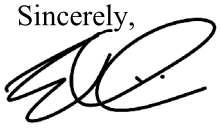
ANSWER: *Not applicable.*

8. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?

ANSWER: *Not applicable.*

I greatly appreciate the opportunity to provide commentary on this issue. Please contact me with any questions regarding my pre-filed testimony.

Sincerely,



John F. Peiserich

ENERGY RESOURCES PLANNING TASK FORCE

TESTIMONY QUESTIONS

1. To assist the Task Force in greater understanding of lessons learned, please briefly summarize key challenges or opportunities encountered unique to the recent extreme weather events.

   There were no challenges or unique opportunities encountered as a result of the recent extreme weather events.

2. Are you aware of any planned additional Liquefied Petroleum Gas pipeline terminals in the state in the near future?

   No, we are not aware of any planned additional LPG pipeline terminals in the state in the near future.

3. Are additional pipeline terminals within the state possible?

   Yes, if the right opportunity arose additional pipeline terminals are certainly possible.

4. Are there any incentives the state could provide that would strengthen your position within the state or could help add additional terminals?

   As a pipeline operator in the State of Arkansas, we are not aware of any incentives that could help the state add additional terminals.

5. In order to pull product off your line, do you have a minimum barrel requirement? If "yes," what is the requirement?

   Yes, the pipeline has a minimum batch size of 25,000 barrels (provided however that a tender of 10,000 barrels or more will be accepted if it can be combined with Propane of the same specification to make a batch of 25,000 barrels or more) and the Pipeline may require the receiving facilities to accept delivery at full line rates.

6. Do you work off of annual purchase for seasonal allocation?

   No, as a pipeline we transport Propane for our Shippers.

7. What would recommend as the total above ground Liquefied Petroleum Gas storage requirement to adequately serve a terminal?

   A terminal should store at least ten days of anticipated terminal Propane throughput.

8. Are there any points along your pipeline in Arkansas that would readily lend itself to building a terminal?

   Our pipeline has not presently identified any points that would readily lend itself to the construction of a terminal.

9. Are there other entities not included in the Executive Order from which the Energy Resources Planning Task Force should hear testimony?

   Arkansas Gas Association and Arkansas Oil Marketers Association

10. What existing regulatory requirement could be changed or done away with that would help strengthen your position within the state?

    We are not aware of any regulatory requirements that could changed or removed to strengthen our position in the state.

11. What new regulatory requirement could be put in place to ensure an adequate supply during shortages of critical energy resources?

    Regulation should focus on encouraging Propane users to maintain healthy tank inventories prior to and during the winter months and, similarly, regulations should encourage Propane wholesalers and retailers to pre-buy inventory in preparation for winter.

12. Describe your preparedness and allocation process for critical energy resources during extreme events.

    Each year prior to the winter season, the pipeline carries out routine checks to confirm critical equipment and all facilities are prepared for cold weather. This includes confirming equipment needed during cold weather is available and operational at all meter stations.

    Typically a week before a specific anticipated event, personnel convened a call to discuss the weather forecast and to go over plans to prepare for and respond to any impacts the weather might have on operations. Staffing at critical points may be increased or shifted to a 24-hour basis, and steps were taken to ensure personnel had sufficient supplies to ensure their safety if they were stranded at the facilities. Additional parts, light blankets, and other supplies are often made available.

    As a pipeline our allocation process is fair and equitable in accordance with our published allocation procedure.

13. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?

Routine communications between the pipeline and our Shippers, including but not limited to on the subject of allocations, are conducted utilizing our company's proprietary accounting and distribution software.

ENERGY RESOURCES PLANNING TASK FORCE

Please send your responses to ERPTaskForce@adeq.state.ar.us on or before April 30, 2021.

LIQUEFIED PETROLEUM GAS

Terminals

1. To assist the Task Force in greater understanding of lessons learned, please briefly summarize key challenges or opportunities encountered unique to the recent extreme weather events.
    - Not unique to this winter only, but most winters, marketers are required to leave the state to find additional supply that the infrastructure in Arkansas is not able to handle.
2. Are there any incentives the state could provide that would strengthen your position within the state?
    - Maybe something that might encourage marketers to invest in additional propane storage.
3. Do you currently have any expansion plans within the state?
    - We have looked at a few projects.
4. What would be your recommendations to help secure adequate supplies of Liquefied Petroleum Gas for the end user within the state?
    - Similar with what some states do with anhydrous, during a specific time period of the year the hours of service can be waived. This will allow carriers and drivers to be able to plan and prepare for the coming winter. Propane has a very strong safety record.
5. Are there other entities not included in the Executive Order from which the Energy Resources Planning Task Force should hear testimony?
    - Not at this time.
6. What existing regulatory requirement could be changed or done away with that would help strengthen your position within the state?
    - Transloading during some time periods and economic conditions could help with winter supply.
7. What new regulatory requirement could be put in place that would help strengthen your position within the state?
    - Not at this time.
8. Describe your preparedness and allocation process for critical energy resources during extreme events.
    - Private company information. I'm happy to provide, but not in this format.
9. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?
    - Private company information. I'm happy to provide, but not in this format.

Gammill Transport Company, Inc.
dba Ozark Mountain Petroleum
1939 West Main St.
Mountain View, Arkansas 72560

Phone (870) 269-8509
Fax (870) 269-5255

April 30, 2021

Testimony Question Responses

1. The biggest challenges for us during the recent extreme weather was not being able to move trucks for almost a week, which basically mad a bad situation even worse due to the face that before the event, supply was already short; therefore, leaving our customer's inventories relatively low to begin with. After the event, we were so far behind and supply was so limited that our trucks were forced to travel to neighboring states for product
2. There are no incentives that I can think of that the state could provide that would strengthen our position within the state, other than possibly adding more supply facilities strategically placed across the state.
3. A couple things that I think could help secure adequate supplies of LPS for the end user would be to strategically place rail facilities around the state and to work closely with pipeline companies and suppliers to ensure there is enough gas injected into the line to adequately supply the state.
4. I would suggest speaking to pipeline companies (Enterprise) and the main supplier within the state (NGL).
5. Lifting the hours of service sooner instead of waiting until we are in the middle of an event could really help, being as we find that we are already behind to do to supply before the event happens.
6. As stated in #5, lifting the hours of service before an extreme weather event would really help the situation.
7. I try to stay in close contact with all of our customers to help keep up with their inventories, especially when supply starts getting tight.
8. Again, trying to stay in close communication with our customers to try to stay on top of their inventory.

Thank you,

Scott Sefton

Craft propane inc.

SECRETARY BECKY W. KEOGH
ARKANSAS ENERGY & ENVIROMENT
CHAIR, ENERGY RESOUCES
PLANNING TASK FORCE.
LITTLE ROCK, AR.

TO: CHAIR AND TASK FORCE MEMBERS:

WOULD LIKE TO THANK THE TASK FORCE FOR ASKING CRAFT PROPANE TO PARTICIPATE IN THE QUESTIONNAIRE. THE LARGEST CHALLENGE FOR MYSELF AND OTHER PROPANE RETAILERS IS SUPPLY AND ROAD CONDITIONS. THIS IS NOT UNIQUE TO THIS PAST FEBUAREY WEATHER EVENT, IT SEEEMS TO BE THE NORM FOR ANY PROLONGED COLD WEATHER EVENT. PROPANE SUPPLY WAS DECREASED BY A LARGE AMOUNT WHEN ENTERPRISE PIPELINE PRODUCTS REVERSED A 16" PIPELINE THAT RUNS THROUGH THE STATE IN THE SUMMER OF 2013. I WAS INFORMED BY AN ENTERPRISE EMPLOYEE THAT ENTERPRISE HAS TWO LINES A 20" & 16", THE 16" LINE WAS ONLY USED ABOUT A 1/3 OF THE TIME EXCEPT DURING THE WINTER AT WHICH TIME IT WAS KEPT FULL OF PROPANE. AS A CONSEQUENCE OF LINE REVERSAL SPACE FOR PROPANE SHIPMENTS WERE GREATLY REDUCED HAVING DEVASTATING EFFECT ON SUPPLY IN NORTHEAST ARKANSAS.

THIS QUESTIONNAIRE IS ON TARGET. INCREASING STORAGE IN THE DEALER NETWORK WOULD HAVE A VERY POSITIVE EFFECT. HOWEVER, WITH THE PRICE OF STEEL, INCREASING STORAGE MAY BE OUT OF REACH FOR SOME. INCREASING RAIL AND PIPELINE TERMINALS WOULD CERTAINLY BE THE ANSWER, THE OWNERS OF THE TERMINALS WOULD REACH OUT TO WHOLESALERS TO MARKET PROPANE THROUGH THEIR LOCATIONS. THAT BEING SAID, IT WOULD BE MY HOPE THAT THE A.E.D.C. WOULD BE ABLE TO HELP IN THE DEVELOPMENT OF TERMINAL LOCATIONS.

WHAT CAN THE STATE GOVERNMENT DO TO HELP? FOR THE PROPANE INDUSTRY THE ANSWER IS TO ISSUE AN EMERGENCY DECLARATION LIFTING THE H.O.S. REQUIREMENTS SOONER. IN PAST EVENTS, BY THE TIME EMERGENCY DECLARATIONS HAVE BEEN DECLARED, TERIMAL AND DEALER SUPPLIES ARE ALREADY VERY LOW. ROAD CONDITIONS HAVE DETERIORATED MAKING IT DIFFICUILT IF NOT IMPOSSIBLE TO CATCH UP WITH DEMAND. EXAMPLE, THIS PAST FEBRUARY THE WEATHER EVENT ARRIVED ON FEBUARY 9TH THE PROCLAMATION WAS SIGNED ON THE 23RD.

PUBLIC SERVICE ANNOUCEMENTS WOULD BE HELPFUL, INFORMING PROPANE USERS OF THE INCOMING WEATHER EVENT AND THAT ROADS COULD BE COVERED IN ICE AND SNOW IN THE COMING DAYS. URGING PROPANE USERS TO CHECK GAS LEVELS IN THEIR TANKS AND CALL THEIR PROPANE SUPPLIER FOR A FILL UP WHILE ROADS ARE CLEAR.

SINCERELY:

ROHN CRAFT

870-932-4325 • P.O. Box 15105 • JONESBORO, AR 72403

LIQUEFIED PETROLEUM GAS

Terminals

1. To assist the Task Force in greater understanding of lessons learned, please briefly summarize key challenges or opportunities encountered unique to the recent extreme weather events. The primary challenge we faced was getting additional supply into the market to meet the historic demand of the extreme weather event. The spike in demand not only affected Arkansas but the entire central United States hindering our ability to have product brought in by transports and rail from other areas as well. Our facilities that operate off of pipeline supply had a hard time getting additional product as well. Nominations for pipeline shipments have to be made by the 15th of the month prior to shipment. Forecasting what the weather will do 15 to 45 days later can be difficult. Requests to ship additional product above the original nomination is subject to the pipeline's available allocation. Customers were challenged to get to our facilities due to snow covered roads at times.
2. Are there any incentives the state could provide that would strengthen your position within the state? As discussed further in #4, tax incentives or low interest loans offered to retailers to put in additional storage would help minimize the impact of extreme weather events.
3. Do you currently have any expansion plans within the state? Our pipeline suppled terminals have adequate storage capabilities for 99% of the time. We are doing a feasibility study on adding storage at our rail terminal but terminals fed by rail are always limited by railcar inflow which again is hard to forecast for extreme weather events like we just experienced.
4. What would be your recommendations to help secure adequate supplies of Liquefied Petroleum Gas for the end user within the state? Adding additional storage at customer locations would benefit the overall supply system in the state of Arkansas. Periods of excessive demand are often unforeseen so if customers can go into those periods with higher inventory levels then it will help take some of the strain off of the supply chain when those periods do occur. At our pipeline supplied facilities, we compete against other products for line space so we are at the mercy of available line allocation to increase our shipments within a month.
5. Are there other entities not included in the Executive Order from which the Energy Resources Planning Task Force should hear testimony? Outside the state, we work with Valero Memphis Refinery which was not mentioned in the initial phone call we received.
6. What existing regulatory requirement could be changed or done away with that would help strengthen your position within the state? Allow temporary GVW of propane transports to be increased to maximize the product moving to the needed places more efficiently. Along the same lines, allow larger transport tankers (currently used in some other states) to temporarily haul in state during these times of high demand.
7. What new regulatory requirement could be put in place that would help strengthen your position within the state? The state should continue to allow temporary exemptions on driver log times during periods of excessive demand.
8. Describe your preparedness and allocation process for critical energy resources during extreme events. Our marketing and supply team in Tulsa does everything they can to be prepared for the demands of an upcoming season. Unfortunately, we do not have the ability to see such extremes as witnessed this winter to be prepared for this. Our allocation process works by supplying each customer an allotment of product based on what we have in supply and what they have pulled from the terminal in the past. In other words, the more business

they do with us, the more loads they are allocated during times of high demand and low supply. The ratio of loads allocated is directly related to the amount of business they have done with us in the recent past.

9. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification? Our sales people notify customers by email and phone calls, and vice versa.

LIQUEFIED PETROLEUM GAS

Dealer

1. To assist the Task Force in greater understanding of lessons learned, please briefly summarize key challenges or opportunities encountered unique to the recent extreme weather events.

Dealer 2- This winter was kind of a "Perfect Storm" where we saw bitterly cold temps and then a terminal shut down. Can't really plan for both those to happen. We had our loads scheduled appropriately but then road conditions got tough.

Dealer 3- First major obstacle: the suppliers (Transports) stopped delivering to us. While there was a day to two days where the roads where inaccessible, the gas we ordered a week before the storm was never delivered. Our storage tanks were full as the calls came in and we were supposed to receive transports to keep them full before the storm, but they stopped delivering to us 4 days before the snow came and didn't deliver for another 3 days after the worst of the storm hit. Second major obstacle: road conditions. We ran trucks every day and some counties did a great job on the roads while others waited days before they would clear the major roads. It would take two hours to make a delivery that was normally done in 15 minutes. Third major obstacle: the wholesalers that had monthly price contracts used their legal exit clauses to break the contracts and increase prices substantially. While I understand the prices are based on a set benchmark plus X…the increasing of X because of cold weather doesn't make sense to me. The benchmark (adjusted daily) increased because of demand why would X increase. If we raised our prices like that then the end user would be filing price gouging complaints.

2. Are there any incentives the state could provide that would strengthen your position in the state?

Dealer 3- Reduce taxes/fees and use that as an incentive for companies to invest in their own storage and equipment.

3. Would increasing storage in the dealer network help manage an adverse weather event?

Dealer 2- We are definitely looking at increasing our storage capacity partly due to growth but also to prevent what happened this winter

Dealer 3- I believe an increase in storage will help but at what costs? It is hard to ask the retailers to

spend X amount of money to increase storage and pay annual maintenance costs if these storms are not frequent enough to support the costs. Our objective is to sell propane and having more of it will always help, assuming the storage doesn't cost us more than we can sell it for.

4. Would an increase in the number of wholesalers in the state help manage an adverse weather event?

Dealer 1- not really, the number of wholesalers would still be the same gallons. Transloading facilities would help though

Dealer 3- An increase in competition cannot hurt…the small propane dealers get moved down the priority list with the wholesalers because we don't have enough business to entice them to help us.

5. Would an increase in the number of pipeline or rail terminals within the state help manage an adverse weather event?

Dealer 1- No because there are only so many hours in a day to access product

Dealer 3- I believe it would help. The majority of wholesalers in our area are bringing propane from out of state. Make it where the bobtails can go get the propane in state if the transports don't want to deliver.

6. Are there other entities not included in the Executive Order from which the Energy Resources Planning Task Force should hear testimony?

7. What existing regulatory requirement could be changed or done away with that would help strengthen your position within the state?

Dealer 1- Davy Jones Piracy Act; must have a US flagged vessel to deliver gas

Dealer 2- Governor and our LP Gas Board did a great job loosening up hours of service and giving us the authority to fill other companies' tanks to get people through the horrible weather. We also had some fellow dealers that shared some gas with others. That was a huge help. Thanks Danmar Propane!!!!!!!!!!

8. What new regulatory requirement could be put in place that would help strengthen your position within the state?

Dealer 1- Can't think of any

9. Describe your preparedness and allocation process for critical energy resources during extreme events.

Dealer 1- Dealers should not let tanks run low in the winter

Dealer 2- We had locales scheduled daily to keep up with demand but you just can't plan for the road conditions, cold weather and then a terminal going down

10. Describe your notification process to end users when curtailing services. How does the end user appeal or request consideration of unique circumstances upon notification?

Dealer 2- We notified our customers via Facebook and our website to conserve fuel.

Dealer 3- We spoke with them as the calls came in and put out notices via our social network products. The end user would just need to provide our office any notice whether in writing or via calls if they have a unique circumstance that needs to be addressed.

Dealer 4 overall answer- Probably for most the immediate answer is to increase storage capacity where needed and to keep in the top side of your inventory instead of the low side of your storage capacities.