



AECC- February 2021 Winter Storm Brief



**Arkansas Electric
Cooperative Corporation**

Generation Emergency Event- Load Impacts

- Firm loads were curtailed for short periods across the state
- SPP (covering 1/3 of western Arkansas) called on interruptions on Monday afternoon, Feb. 15, and the morning of Tuesday, Feb. 16
- MISO (covering 2/3 of eastern Arkansas) called on interruptions on Tuesday evening, Feb. 16
- 13,081 of our member owners' power was cut on Feb 16th
 - 6,592 Craighead Electric
 - 6,489 at Woodruff Electric
- AECC's Members serve 8 interruptible industrial retail Members who were curtailed multiple times from February 15 through February 17



MISO Timeline of Generation Emergency Events

- Cold Weather Alert effective 02/13/2021 00:00 EST
- MISO declares Conservative Operations for Reliability Coordinator Footprint effective 02/14/2021 12:00 EST
- MISO Capacity Advisory for the South Region to begin Monday 02/15/2021 09:00 EST
- MISO South Region Max Gen ALERT effective 02/15/2021 07:00 EST
- South Region Max Gen Warning effective 02/15/2021 18:00 EST
- Max Gen Event - EEA 2 effective 02/15/2021 18:00 EST
- MISO South Region Max Gen Warning effective 02/16/2021 00:00 EST
- Max Gen Event - EEA 2 effective 02/16/2021 08:00 EST
- **Max Gen Event - EEA 3 effective 02/16/2021 19:40 EST; 700 MW of load was curtailed across MISO South, including by AECC**
- Max Gen Event - EEA 2 effective 02/16/2021 22:00 EST
- Max Gen Event - EEA 0 effective 02/17/2021 00:00 EST
- Max Gen Alert effective 02/17/2021 02:00 ES
- South Region Max Gen Event 2C - EEA 2 effective 02/17/2021 18:00 EST
- Max Gen Alert effective 02/17/2021 21:30 EST
- MISO South Max Gen Termination effective 02/19/2021 11:00 EST
- Capacity Advisory Termination effective 02/19/2021 11:00 EST
- Conservative Operations Termination effective 02/20/2021 16:00 EST
- Cold Weather Alert Termination effective 02/20/2021 16:00 EST



SPP Timeline of Generation Emergency Events

- **Feb. 9 at 00:00 a.m.** In response to the current cold-weather event, SPP first declared a period of conservative operations...
- **Feb. 15 at 00:00 a.m.** SPP requested that load-serving utilities throughout the SPP region conserve energy ...
- **Feb. 15, at 05:00 a.m.** SPP declared an Energy Emergency Alert (EEA) Level 1, meaning that all available resources had been committed to meet obligations, and SPP was at risk of not meeting required operating reserves.
- **Feb. 15 at 7:22 a.m.** SPP declared an EEA Level 2 which required SPP to ask its member companies to issue public conservation appeals and served as a maximum emergency generation notification for resources,
- **Feb. 15 at 10:08 a.m.** SPP declared an EEA Level 3 when it was forced to begin relying on required reserve energy. This meant it was carrying reserves below the required minimum and had initiated assistance through the Reserve Sharing Group.
- **Feb. 15 at approximately 12:10 pm.** While still under EEA Level 3 and after exhausting reserves, SPP directed member utilities to implement controlled, temporary interruptions of service.
- **Feb. 15 at 2:00 p.m.** SPP declared a return to EEA Level 2, ...
- **Feb. 16 at 6:15 a.m.** SPP declared 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 directed member utilities to implement controlled, temporary interruptions.
- **Feb. 16 at 10:07 a.m.** SPP had restored all load, meaning it had enough generating capacity available to meet system-wide demand. It remained in an EEA Level 3, indicating it was still operating below required minimum reserves.
- **Feb. 16 at 11:30 a.m. to Feb. 18 , 9:30 am** – remained in either EEA Level 1 or EEA Level 2
- **Feb. 18 at 9:30 a.m.** SPP downgraded from EEA Level 1 to a conservative operations status.
- **Feb. 18 at 6:25 p.m.** SPP declared an EEA Level 1, ...
- **Feb. 19 at 9:20 a.m.** SPP downgraded from EEA Level 1 to a conservative operations status.
- **Feb. 20 at 10:00 p.m.** SPP returned to normal operations ...

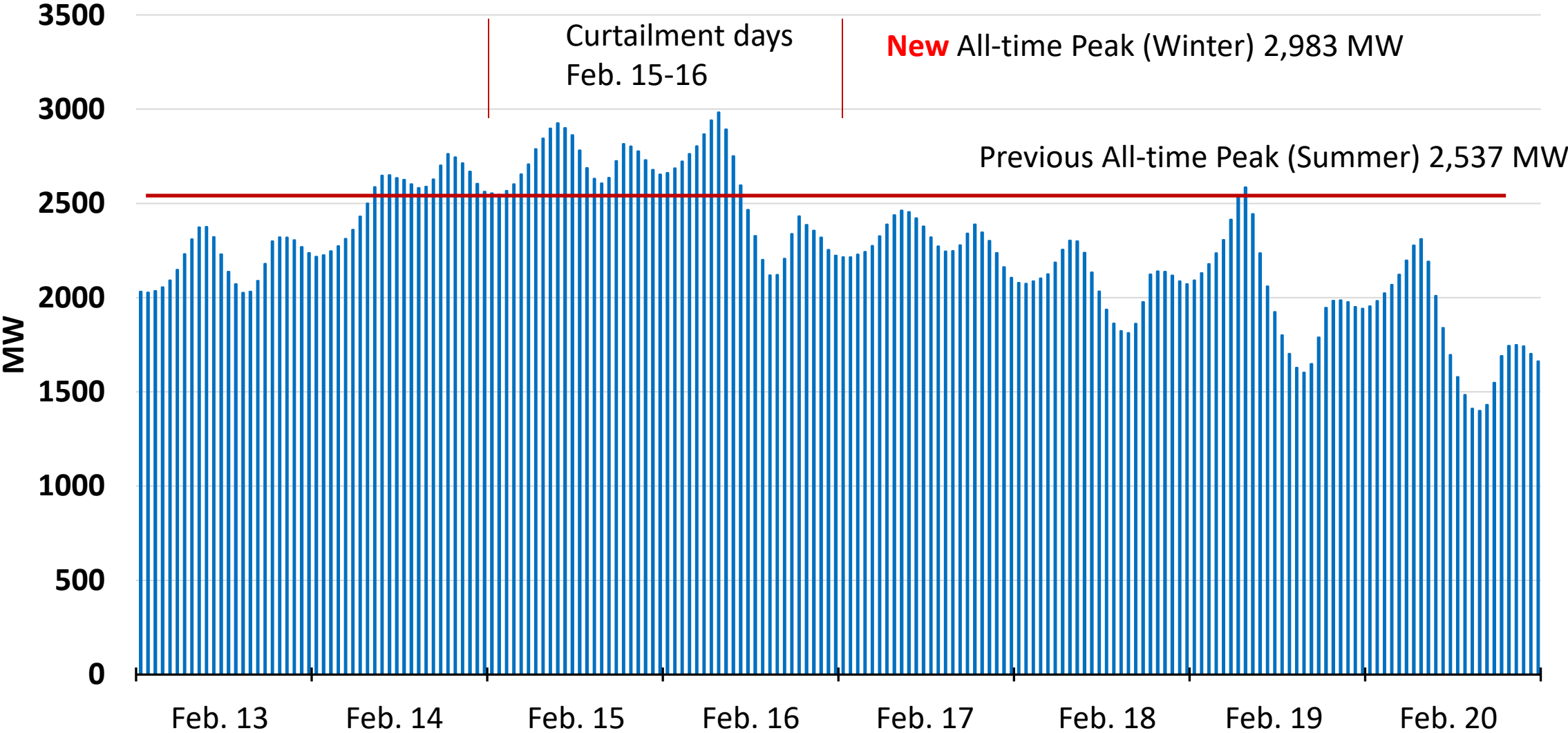


Weather

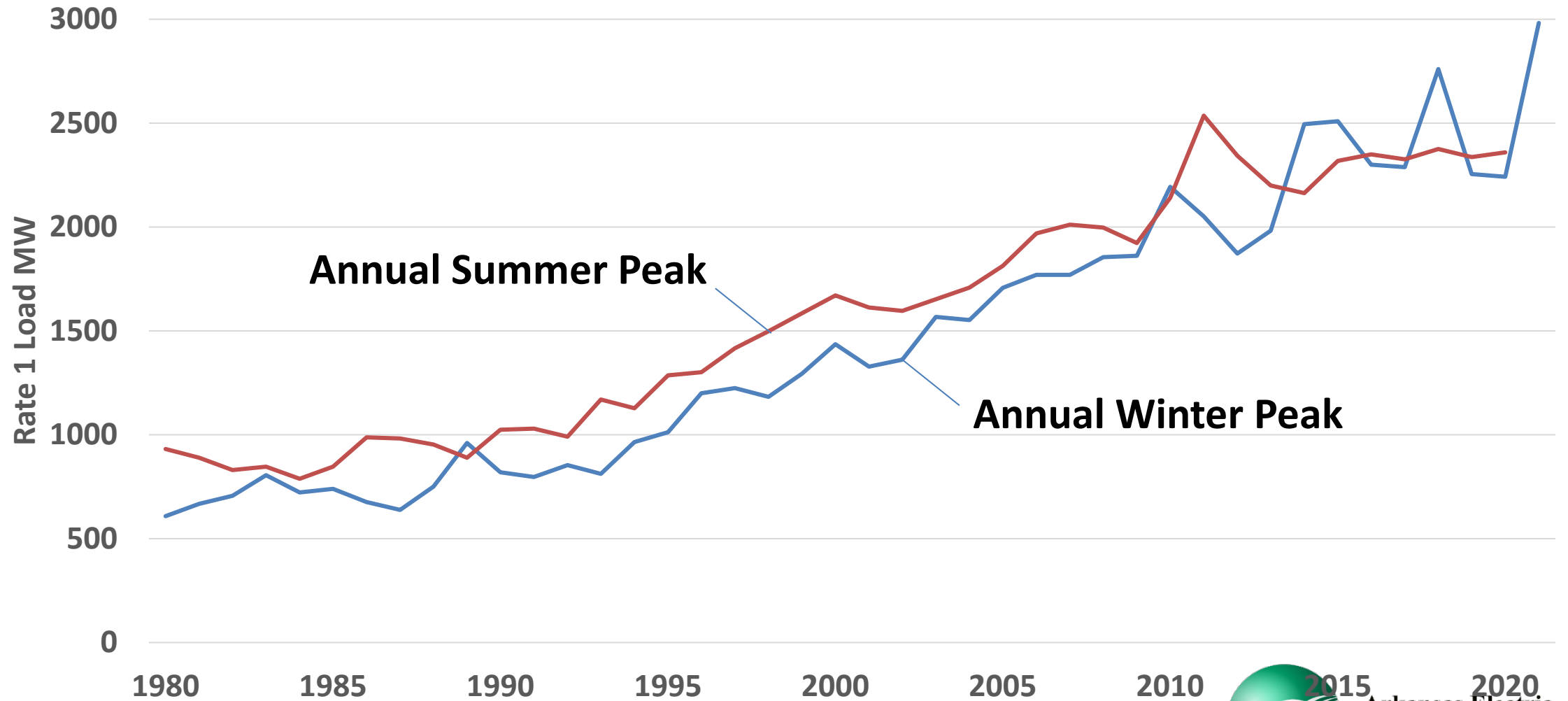
- All-time demand and energy usage
- Well freeze-offs due to icing and temperatures impacted natural gas production in the mid-continent/Oklahoma region, causing both exorbitant pricing and lack of supply
- Numerous natural gas and coal plants impacted by extreme cold with partial and forced outages
- Snow caused issues with trucking oil to plants, used as back-up fuel
- Wind farms impacted by icing and poor wind conditions
- Overcast conditions and snow significantly reduced solar output, AECC peaks are occurred before sunrise or after sunset so solar unable to contribute.



AECC Firm (Rate 1) Demand, Feb. 13-20



AECC Rate 1 Peak Demands



Excerpt from AECC letter to 7 MISO Industrial (IC-Rate) Retail Members, Saturday morning, Feb. 13

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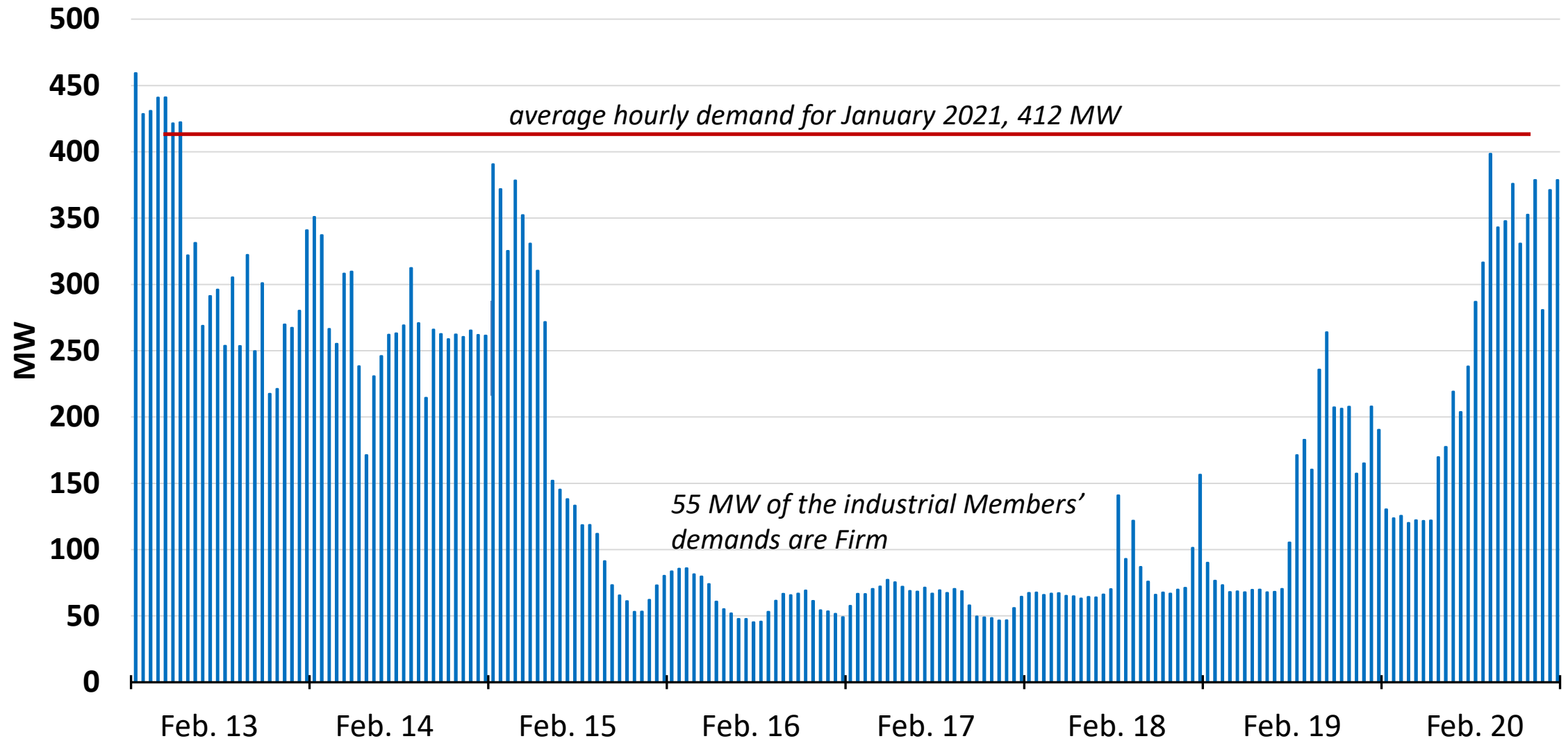
I have not seen conditions like this in my 30 years in the industry, when considering both the gas and power markets. I ask that you please be prepared at any time over the coming days to curtail to firm service levels with 3-hours notice. If unexpected and severe emergency conditions occur on the power grid, such as might occur with the loss of multiple power plants, interruptibles may have to be curtailed immediately, and would be curtailed before firm loads. In the spirit of hoping for the best and planning for the worst, I ask that you please consider voluntary reductions in demands, particularly on Monday and Tuesday mornings. We will work with you to ensure that voluntary reductions will count toward the economic interruption annual limits for any times during these days if we are aware of them

...

AECC staff provided verbal notice even earlier of impending conditions. AECC believes this is the first time ever that E-mailed notice such as this has been provided to the MISO Industrial (IC-Rate) Members



Industrial (IC-Rate) Retail Members' Demands, Feb. 13-20



AECC's Natural Gas Use



- AECC has six wholly owned natural gas fired power plants that are served by four different pipelines:
 - Ozark Gas Transmission – Fitzhugh
 - Enable Gas Transmission –McClellan and Magnet Cove
 - NGPL – Fulton & Oswald
 - Black Hills Energy – Elkins



AECC's Natural Gas Use



- AECC converted from normal use of natural gas to back-up fuel oil at Fitzhugh and McClellan, with an oil cost of approximately \$15/MMBtu; Ozark pipeline supplied AECC with emergency gas for use when Fitzhugh had a short-term forced outage during the event.
- AECC was able to run Oswald and Fulton on NGPL. Gas for Fulton was purchased as high as \$220/MMBtu (approximately 100x normal). Gas for NGPL is sourced from Texas/Louisiana.
- Enable, which sources its gas from Oklahoma, was under the most severe constraints. Pricing was as high as \$400/MMBtu. Penalties for non-ratable usage would be an additional \$775/MMBtu.



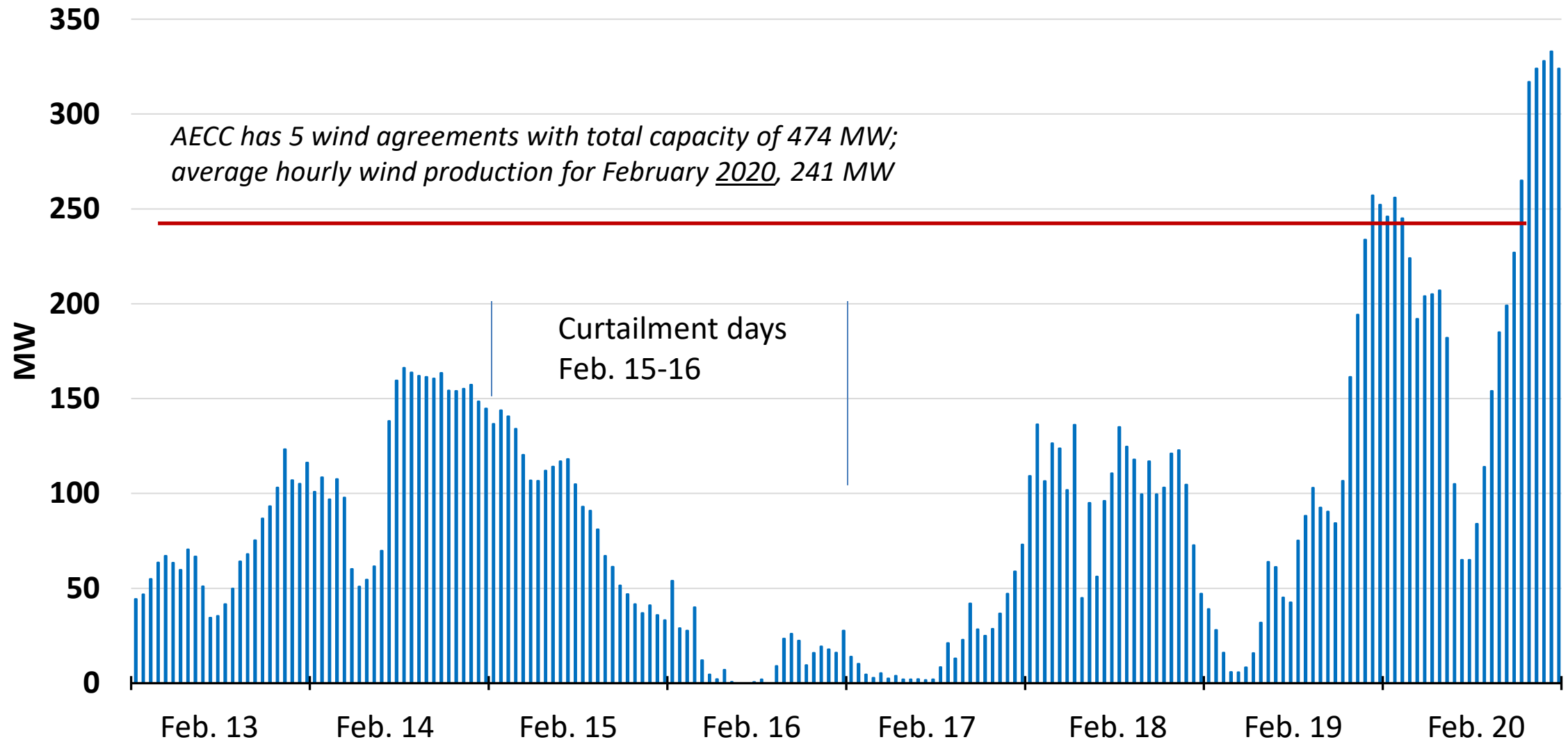
Fuel Oil Use at Fitzhugh and McClellan



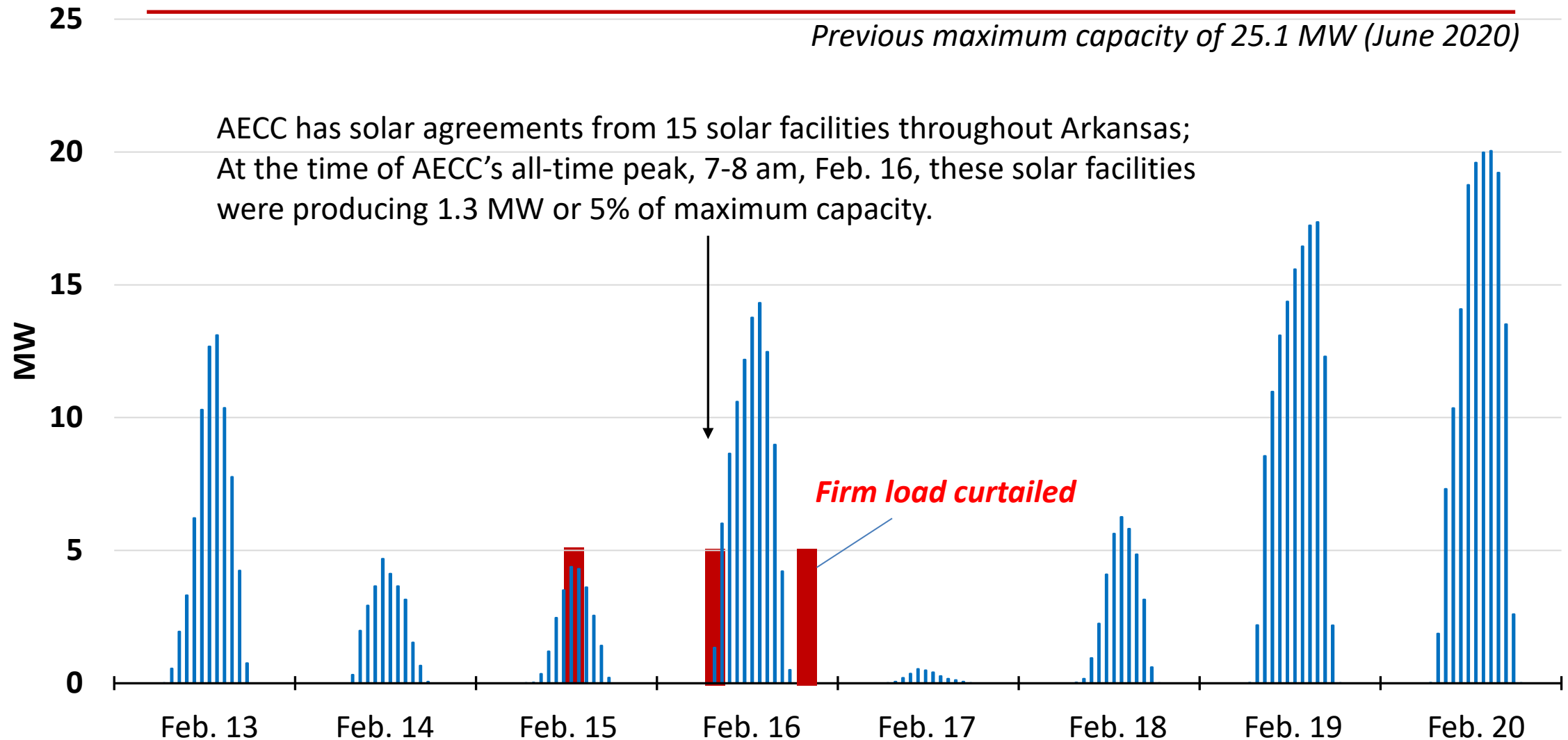
- Fitzhugh, in Ozark, Arkansas, is in SPP
 - Market cost of power was \$39.5 million; our oil and gas cost \$5.5 million; savings of \$34 million burning diesel and contributed to electric grid reliability.
 - Approximately 70 truckloads were delivered to the plant during the emergency event
 - The plant burned **1,328,000** gallons of fuel oil
- McClellan, in Camden, Arkansas, is in MISO
 - Market cost of power was \$3.3 million; our oil cost \$0.6 million; savings of \$2.7 million burning diesel and contributed to electric grid reliability.
 - Natural gas just to start up the plant would have cost \$5.4 million; AECC used a propane system instead; cost of propane was \$23,600
 - The plant burned **502,936** gallons of fuel oil



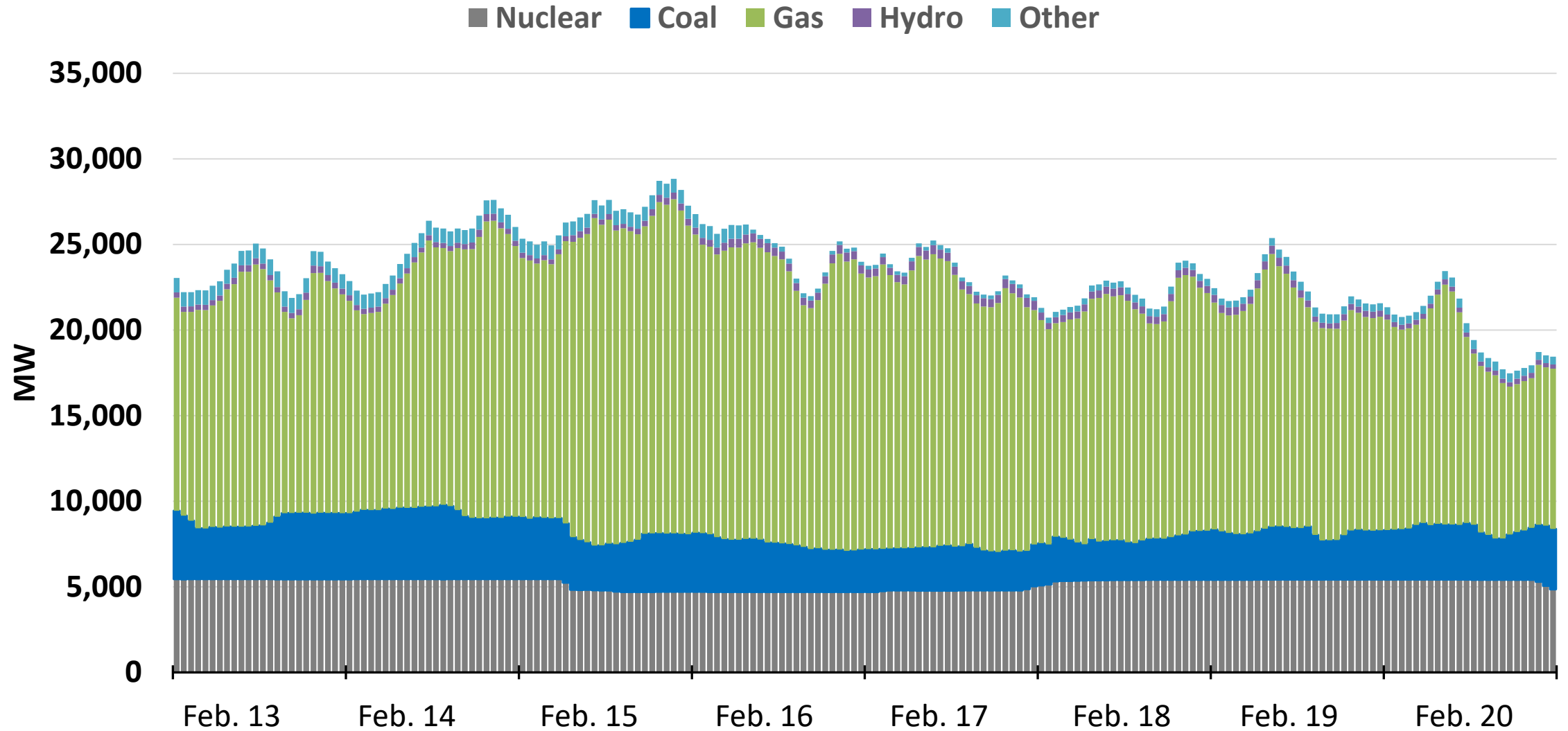
AECC Wind Production, Feb. 13-20



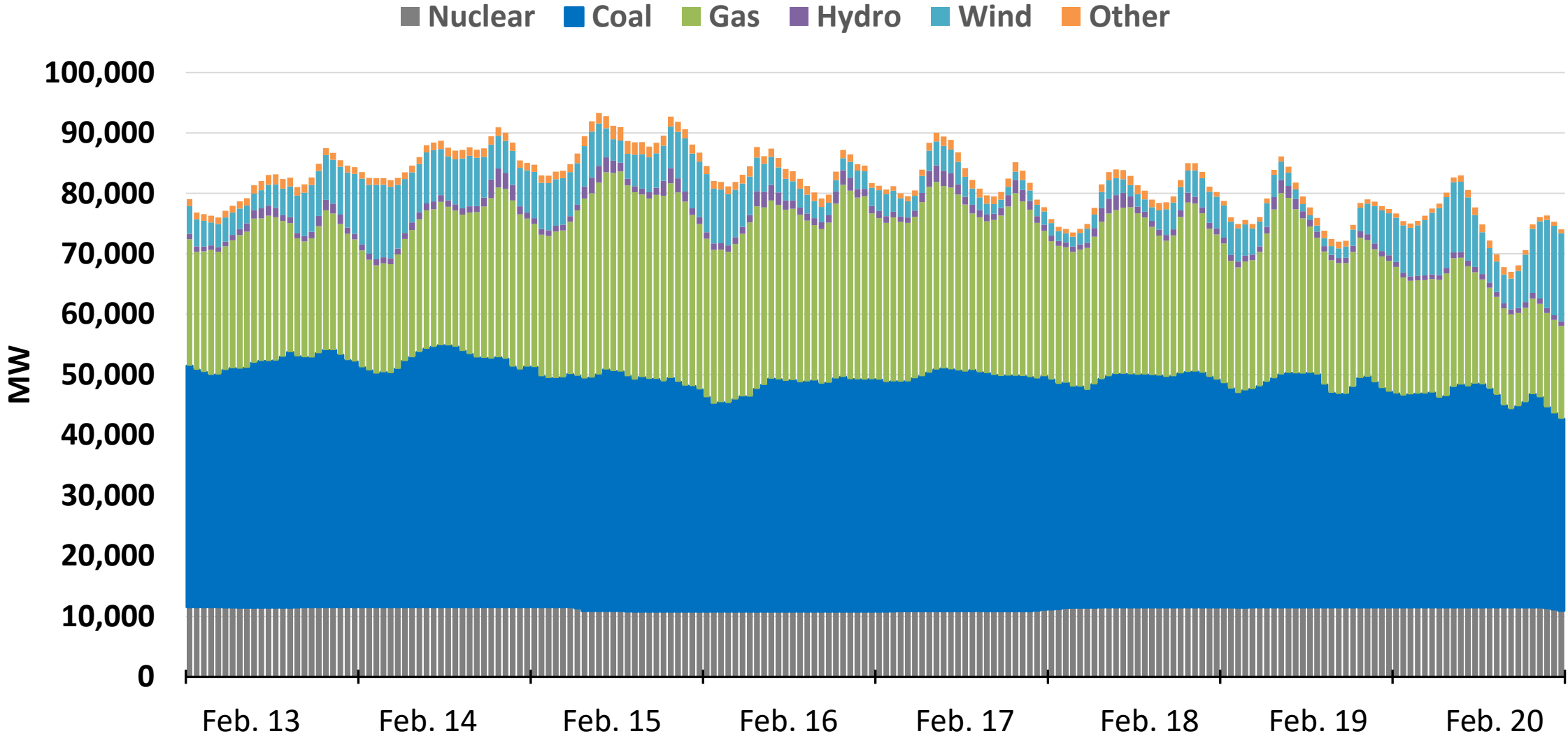
AECC Solar Production, Feb. 13-20



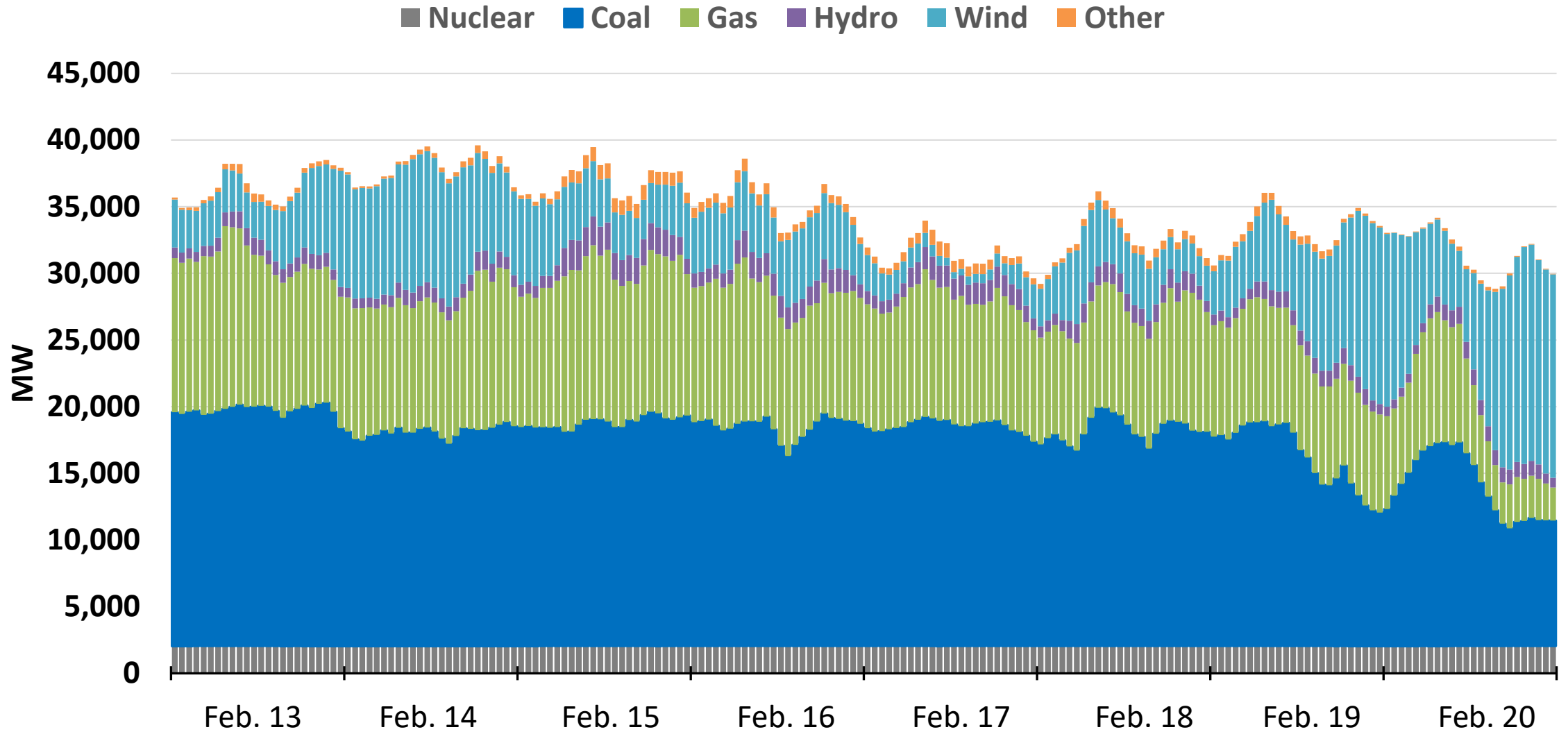
MISO South Generation Mix, Feb. 13-20



MISO Generation Mix, Feb. 13-20



SPP Generation Mix, Feb. 13-20

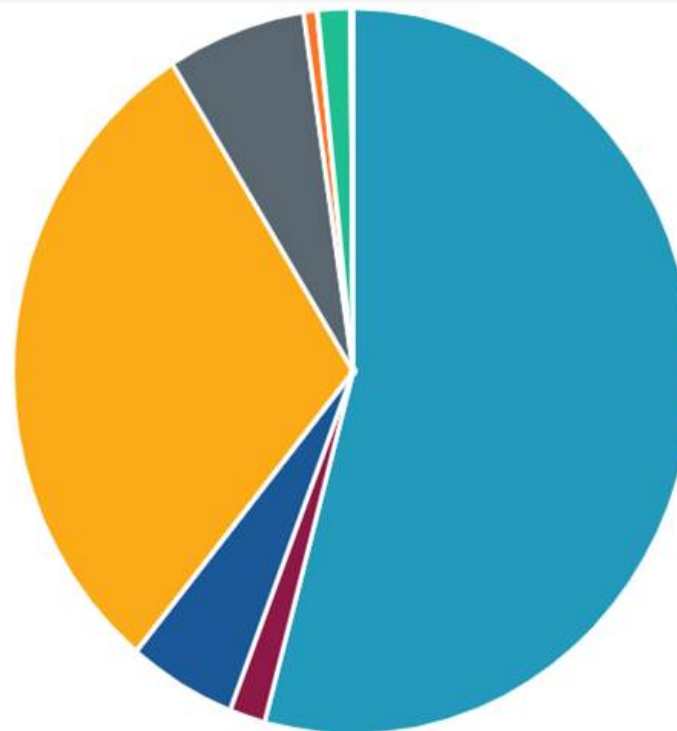


Example of SPP Generation Mix during Emergency Event

Generation Mix for 2021-02-17 12:40:00 (Central Time)

Pie chart view of current generation mix percentage by fuel type.

- Coal: (54.1959%)
- Diesel Fuel Oil: (1.7049%)
- Hydro: (5.1070%)
- Natural Gas: (30.0706%)
- Nuclear: (6.5840%)
- Solar: (0.6381%)
- Waste Disposal Services: (0.0317%)
- Wind: (1.5540%)
- Waste Heat: (0.0000%)
- Other: (0.1138%)



AECC was curtailing industrial (IC Rate) load at this time

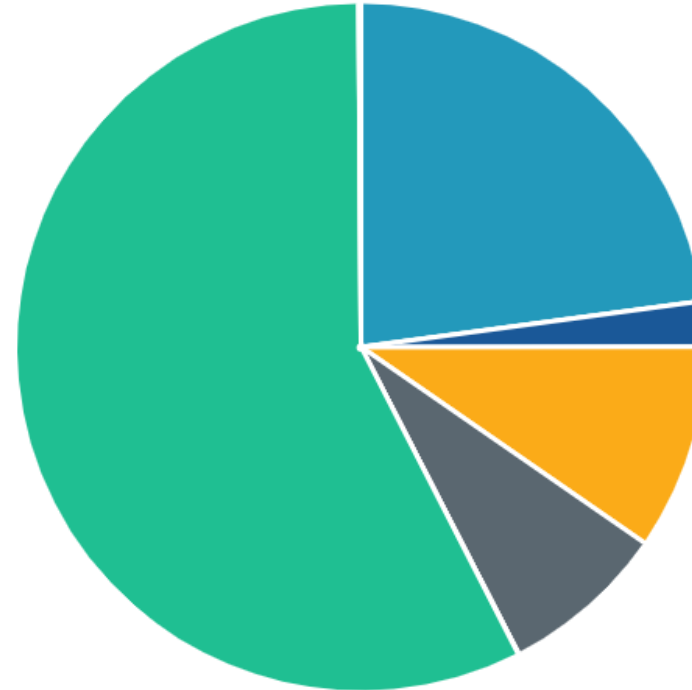


Generation Mix for 2021-02-28 05:05:00 (Central Time)

SPP

Pie chart view of current generation mix percentage by fuel type.

- Coal: (22.8624%)
- Diesel Fuel Oil: (0.0000%)
- Hydro: (2.1149%)
- Natural Gas: (9.6525%)
- Nuclear: (7.8187%)
- Solar: (0.0000%)
- Waste Disposal Services: (0.0311%)
- Wind: (57.4138%)
- Waste Heat: (0.0000%)
- Other: (0.1067%)

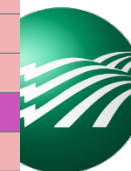


AECC Market Deployment

Plant Menu



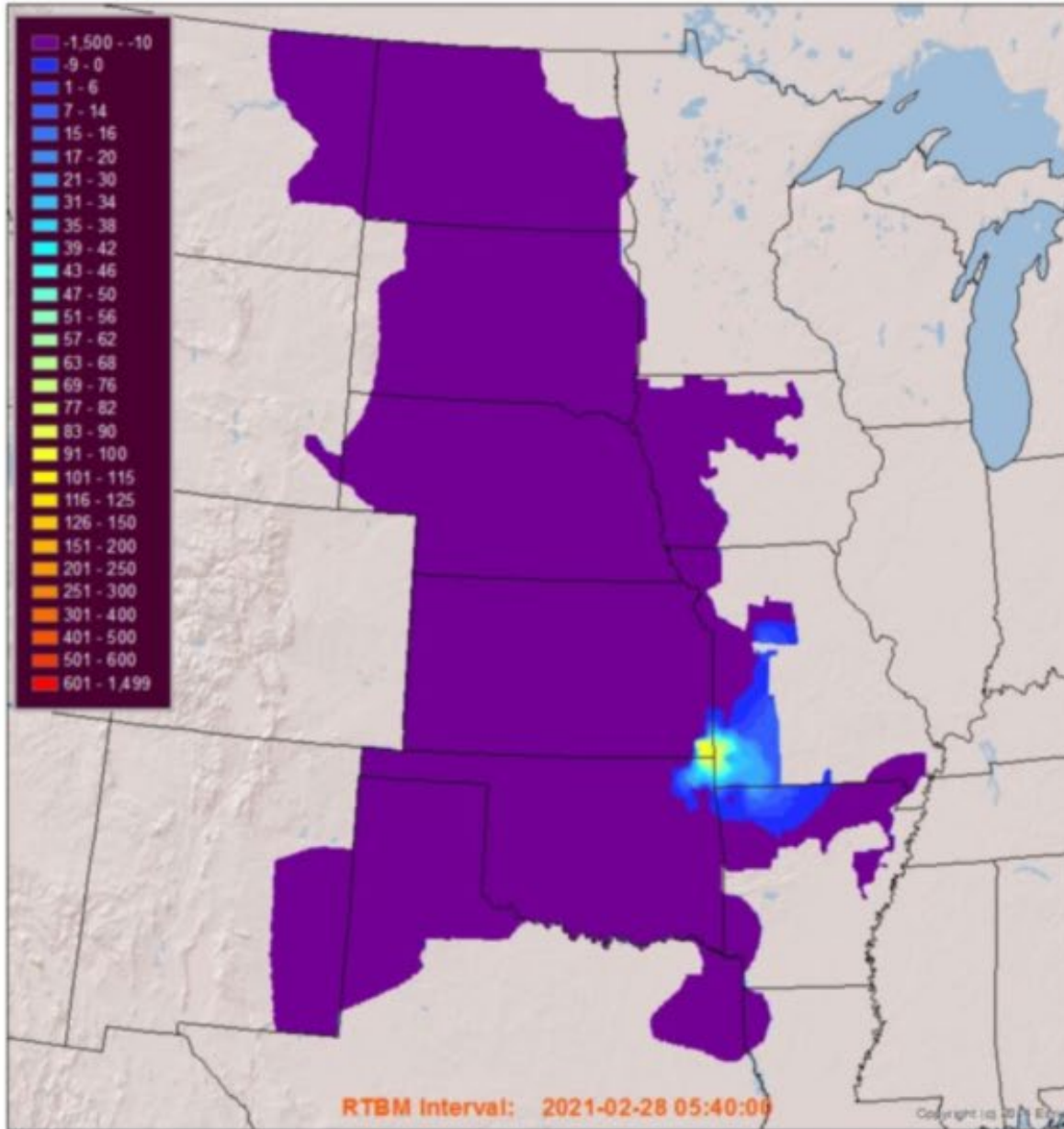
SPP	Solve Date: 28-Feb-21		Solve Time: 05:20:00 CST								
	Flint	Turk	Fitzhugh	Fulton	HS 13	Elkins	Flat Ridge	Origin	Chisholm 2	Drift Sand	Wildhorse
Control Mode	1	0	0	0	-	0	-	-	-	-	-
Current Gen	100.24	0	0	0	15.6	0	17	113.3	39	60.4	87.64
Setpoint	97.9	0	0	0	15.6	0	17 (XML)	109.7 (XML)	39	60.4	87.2
LMP (\$/MWh)	\$3.39	\$-19.10	\$-14.26	\$-18.38	\$-13.25	\$-1.99	\$-35.08	\$-23.97	\$-31.30	\$-26.81	\$-20.70
Start Date	05-Dec-20	17-Feb-21	19-Feb-21	23-Feb-21	04-Feb-21	30-Oct-20	-	-	-	-	-
Start Time	03:43:00 CST	11:00:00 CST	02:00:00 CST	05:00:00 CST	02:00:00 CST	10:00:00 CDT	-	-	-	-	-



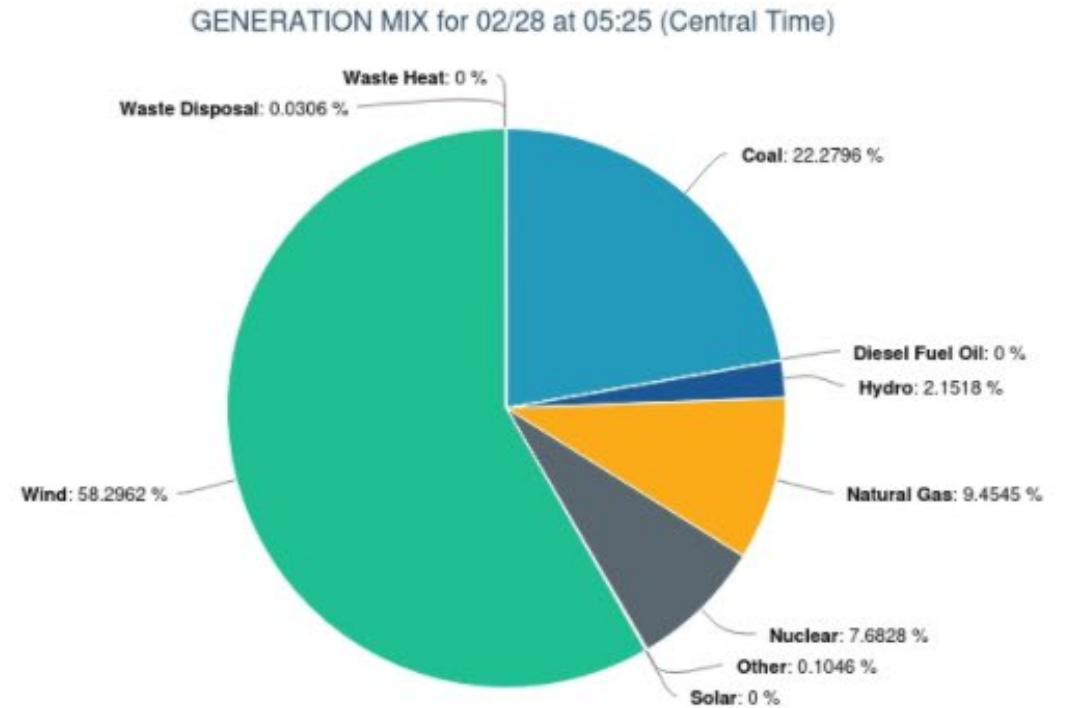
**Arkansas Electric
Cooperative Corporation**

We Are Arkansas

Price Contour Map



Generation Mix



Snipped from home page of www.spp.org

**** External ** Cold Weather Update w/ AECC**



Daryl Brown <DBrown@misoenergy.org>

To Bert Finzer; Andrew Lachowsky; Jay Egan; Matthew Ekstrom

Cc Walter Ferguson; Steve Metcalf; Buddy Hasten; Jessica Lucas; John Harmon; Trevor Hines

You replied to this message on 2/16/2021 3:24 AM.

Reply	Reply All	Forward	
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Tue 2/16/2021 3:23 AM

CAUTION: This external email originated from DBrown@misoenergy.org. Ensure you were expecting this email before opening links or attachments.

Andrew

I am not sure what official notice you need besides this email but we need for you to ...

RE: ** External ** Cold Weather Update w/ AECC



Andrew Lachowsky

To Daryl Brown

[Retention Policy](#) [Sent Items \(90 days\)](#)

Expires 5/17/2021

Reply	Reply All	Forward	
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Tue 2/16/2021 3:24 AM

Understood, we will ...



**Arkansas Electric
Cooperative Corporation**

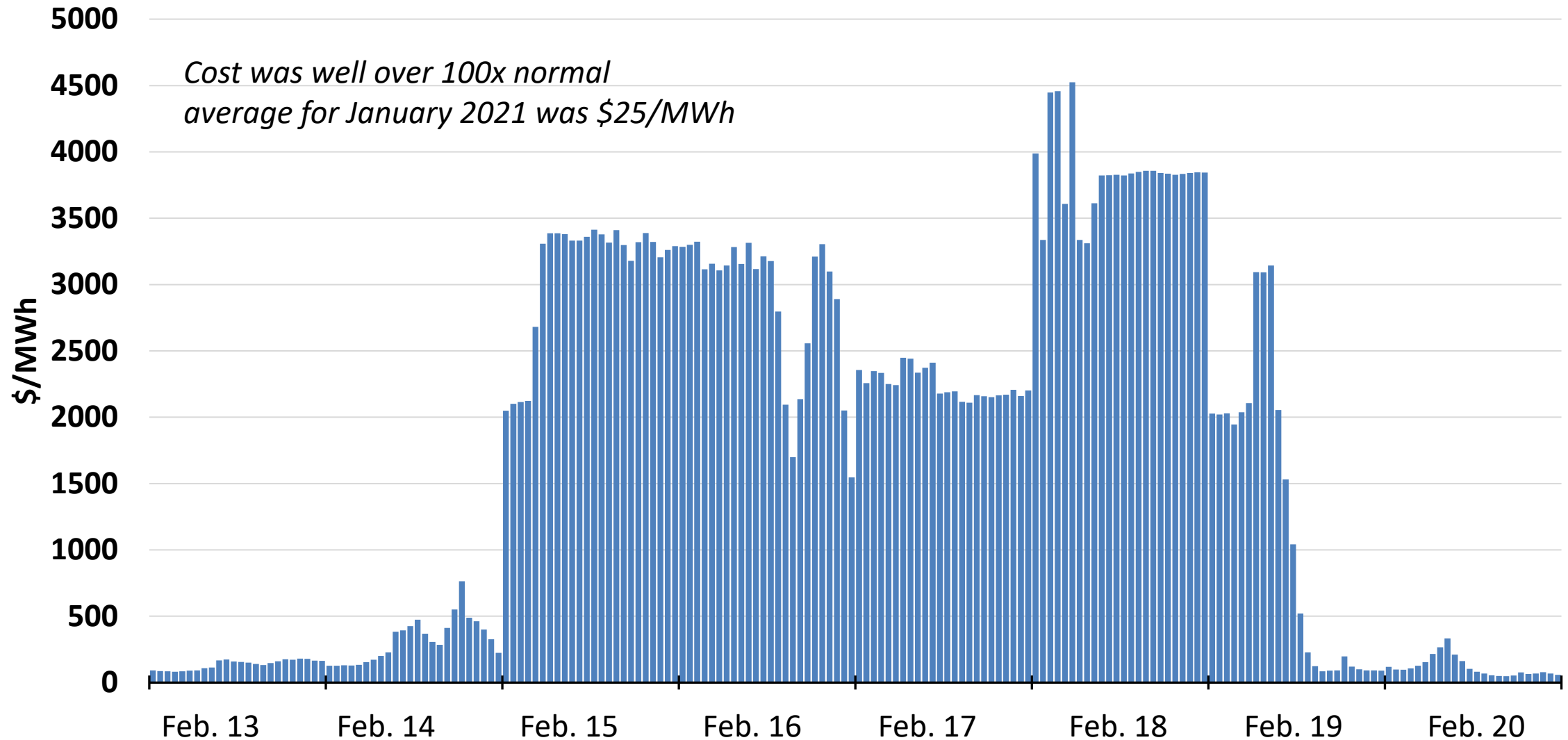
We Are Arkansas 21

Phase 2 of this Disaster – the Cost

- The AECC Board will be deciding how best to recover the significant cost impacts from this event.



AECC Load Cost (\$/MWh) in SPP, Feb. 13-20



AECC Load Cost (\$/MWh) in MISO, Feb. 13-20

