



**BASIN ELECTRIC
POWER COOPERATIVE**

A Touchstone Energy® Cooperative 

Winter Weather Event Findings

October 2021

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Agenda

- February Event Recap
- SPP Key Observations
- NERC/FERC and Regional Entity Findings
- SPP Comprehensive Review
- FERC Approved NERC Recommendations
- Basin Marketing Action Items

SPP Region in Coldest Part of U.S.

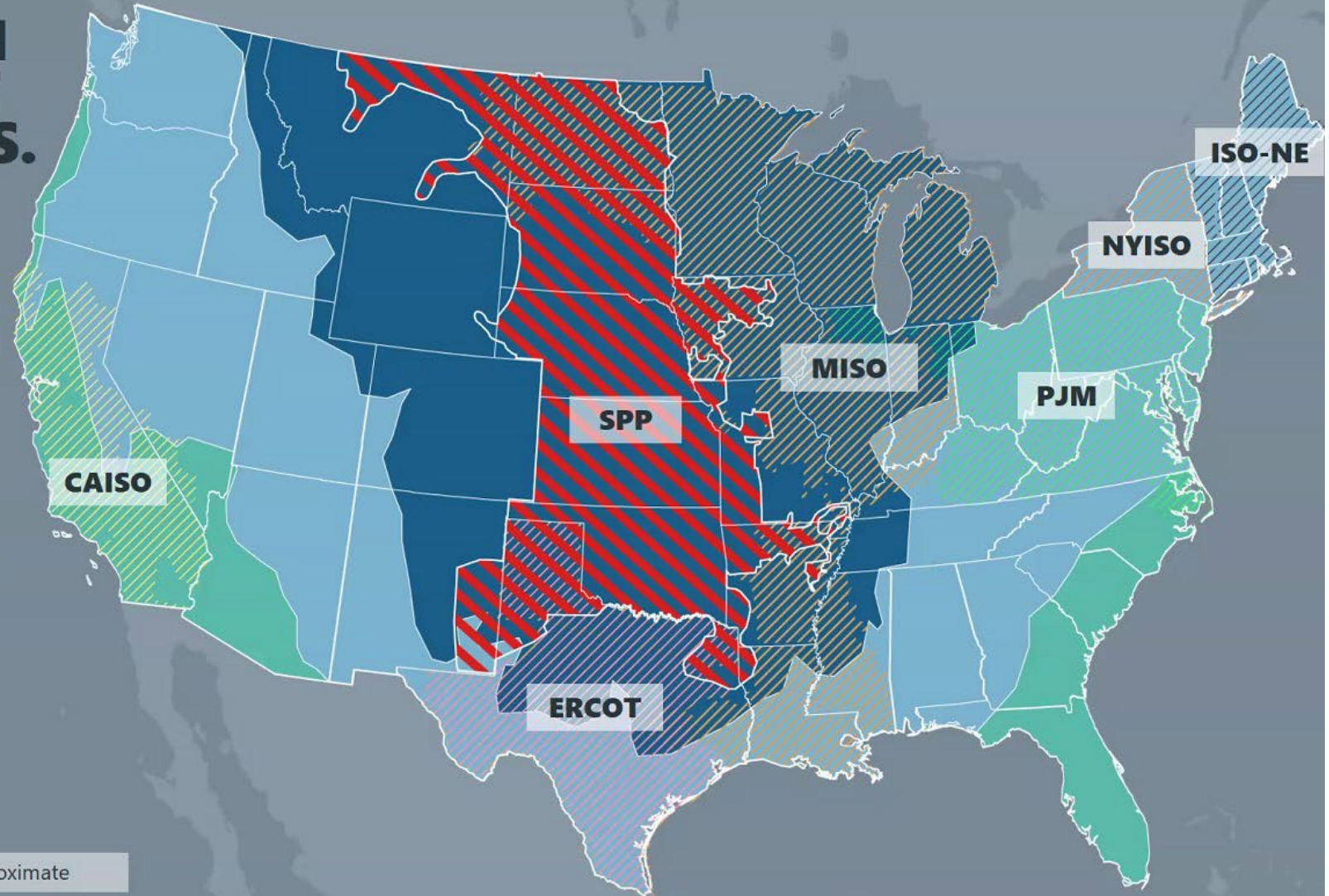
SPP REGION IN COLDEST PART OF U.S.



Lowest temperatures forecast for Feb. 14-16, 2021

Sources: National Weather Service, Global Forecast System

- SPP service territory/ balancing authority
- Temperatures below 0°F
- Between 0° and 32°F
- Above 32°F



* Locations of ISOs/RTOs are approximate

Timeline of SPP Alert Events

Mon 2/8 - Weds 2/17

- **Resource Alert**

- Called by SPP due to upcoming weather events

Tues 2/9 - Weds 2/17

- **Conservative Operations**

- Early commitment of resources was made through 2/17

Mon 2/14 - Weds 2/17

- **EEA1** (Market concerned about maintaining reserves)

- SPP dispatches generation to emergency maxes

Mon 2/15 - Weds 2/17

- **EEA 2** (Market cannot provide all energy requirements but can hold reserves)

- SPP Imports power from neighbors
- First ever EEA2 in SPP Market

Mon 2/15 - Tues 2/16

- **EEA 3** (Market energy deficient and can't hold reserves)

- SPP sheds 600MW Load 2/15
- SPP sheds ~3,000MW Load 2/16

Observations and Findings



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SPP Key Observations

The unavailability of generation driven by the lack of fuel was the largest contributing factor to the severity of the event.

Extremely high natural gas prices were the primary driver of record-high energy offers.

The rapid spike in SPP's market prices resulted in concern about liquidity of market participants and created concerns with credit exposure.

Relationships with neighboring systems were critical.

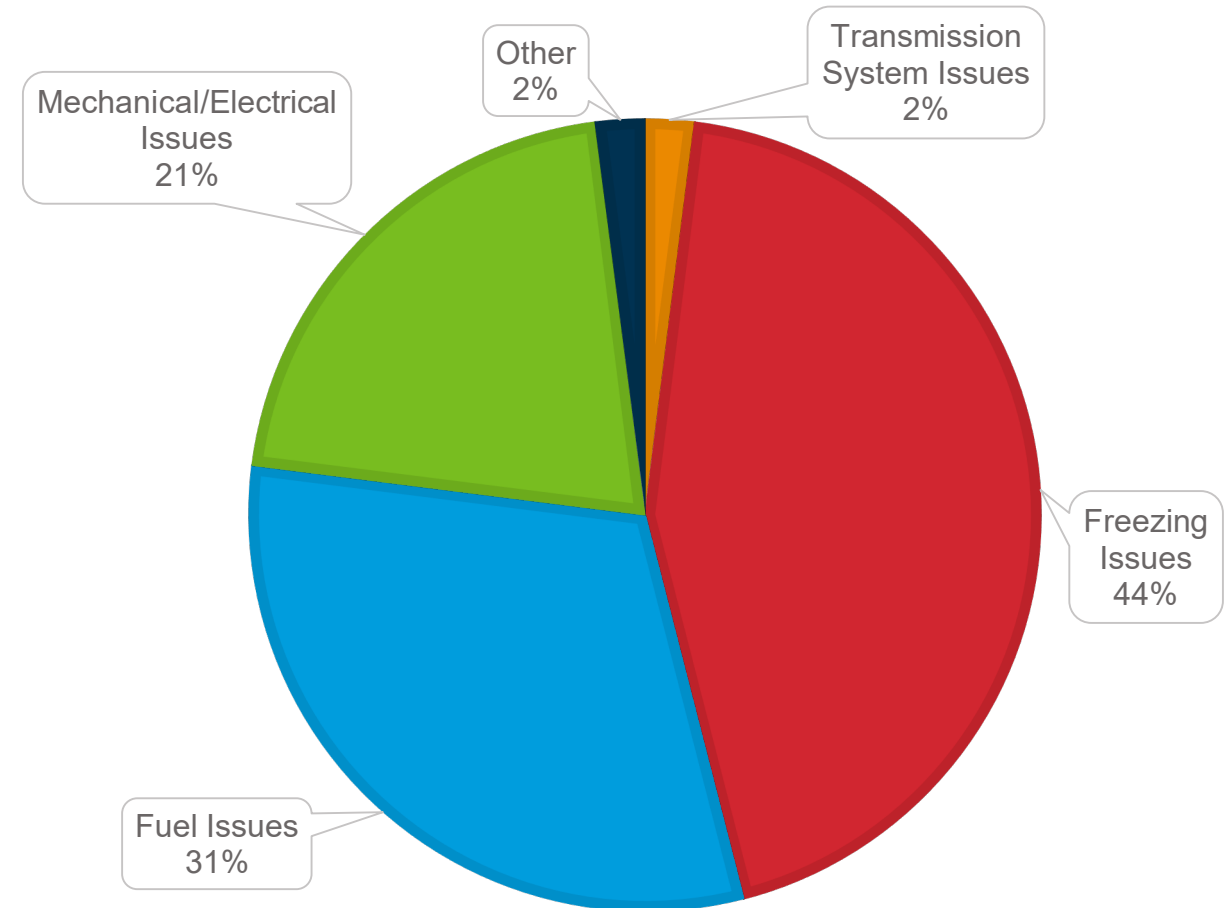
The SPP transmission system was highly congested at times with limitations that prevented full use of generation in some locations.

Early preparation and effective communication helped minimize the storm's impact on reliability.

NERC/FERC Preliminary Findings

- #1 = Freezing Issues

- 473 of the 1,823 unplanned outages, derates, and failures were in SPP
- Most common sub-causes were frozen instrumentation and icing on wind turbine generator blades
- As temperatures decreased, the mechanical/electrical issues increased

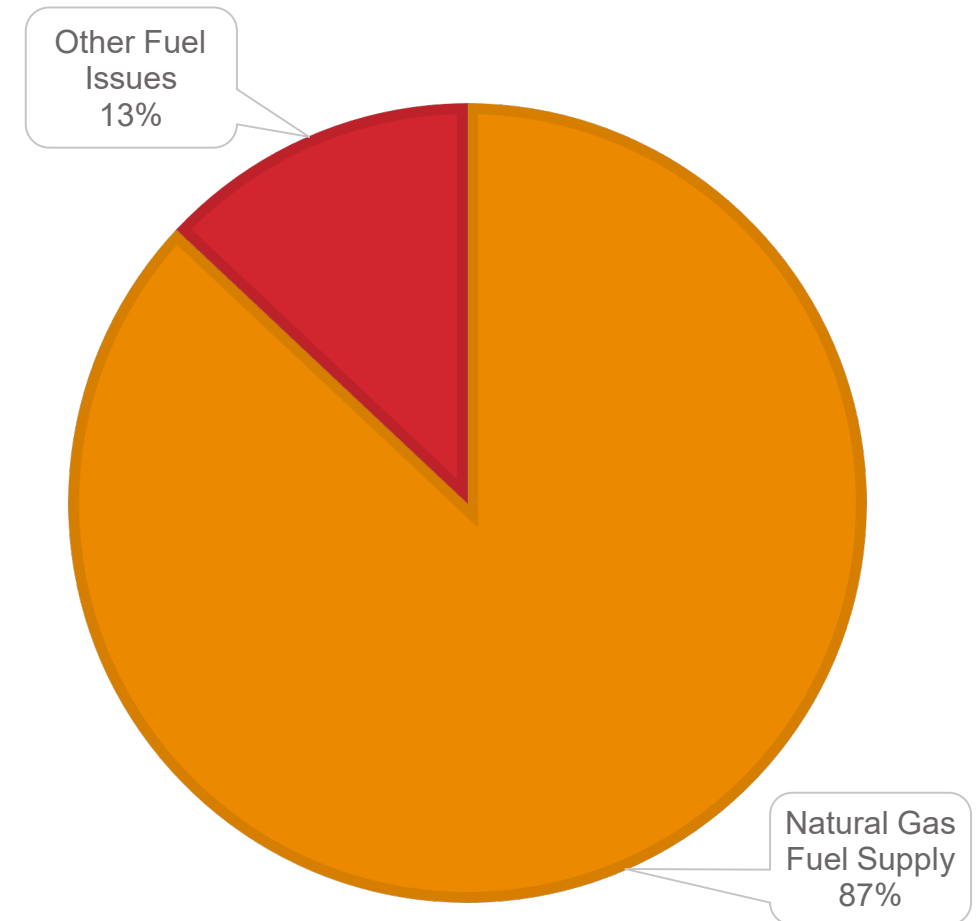


Includes ERCOT, SPP, and MISO

NERC/FERC Preliminary Findings

- #2 = Natural Fuel Supply Issues

- Natural gas fuel supply issues included the combined effects of decreased natural gas production, terms and conditions of commodity and pipeline contracts, and other issues like low gas pressure
- SPP had 141 natural-gas fired generating units experience fuel supply related outages, derates, or failures to start



Includes ERCOT, SPP, and MISO

NERC/FERC Preliminary Findings

- #3 = Natural Gas and Electric Reliability Interdependency
 - Natural gas production facility loss of power was primarily due to weather-related power line outages and firm load shed
 - 60% of natural gas-fired generating units affected by fuel supply issues had outages, derates, or failures to start by Feb 14th, and 32% had fuel supply issues before and after Feb 14th























	2/8-2/14 Prior to Firm Load Shed	2/15-2/20 Firm Load Shed (2/15-2/18)
Total Individual Generating Units	213	258
ERCOT BA Footprint	111	134
SPP Footprint	91	103
MISO South Footprint	11	21

Plan of Attack



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SUMMARY OF RECOMMENDATIONS

	Tier 1	Tier 2	Tier 3
Fuel Assurance (FA)	 		
Resource Planning & Availability (RPA)	 		
Emergency Response Process & Planning (ERP)		  	
Operator Tools, Communication and Processes (OTCP)			
Seams Agreements (SEAMS)			
Market Design (MKT)		  	
Transmission Planning (TXP)			
Credit (CR)			 
Communications (COMM)		 	 
22 TOTAL	4	13	5

High Level Next Steps

Fuel Assurance

- Develop policies that **enhance fuel assurance**
- Evaluate and, as applicable, **advocate for improvements in gas industry policies**, including use of gas price cap mechanisms

Resource Planning and Availability

- Perform initial and ongoing assessments of **minimum reliability attributes** needed from SPP's resource mix
- Improve or develop policies, which may include required performance of **seasonal resource adequacy assessments**, development of **accreditation criteria**, incorporation of minimum reliability attribute requirements, and **utilization of market based incentives**

High Level Next Steps

Emergency Response Process and Planning

- Evaluate alternative means of determining each transmission operator's **allocation of load-shed obligations** and implement **improvements to load-shed processes**

Operator Tools, Communication and Processes

- Enhance the tools, communications, and processes to **improve SPP and stakeholder response** to extreme conditions

High Level Next Steps

Seams Agreements

- Improve seams agreement provision with neighboring parties to facilitate **adequate emergency assistance** and fairly **compensate emergency energy**

Market Design

- Develop and improve policies to **ensure price formation** and **incentives to reflect system conditions**
- Develop and implement **market design and market-related enhancements** to improve operational effectiveness

High Level Next Steps

Transmission Planning

- Develop policies that **facilitate transmission expansion** needed to improve SPP's ability to more effectively utilize the transmission system

Credit and Settlements

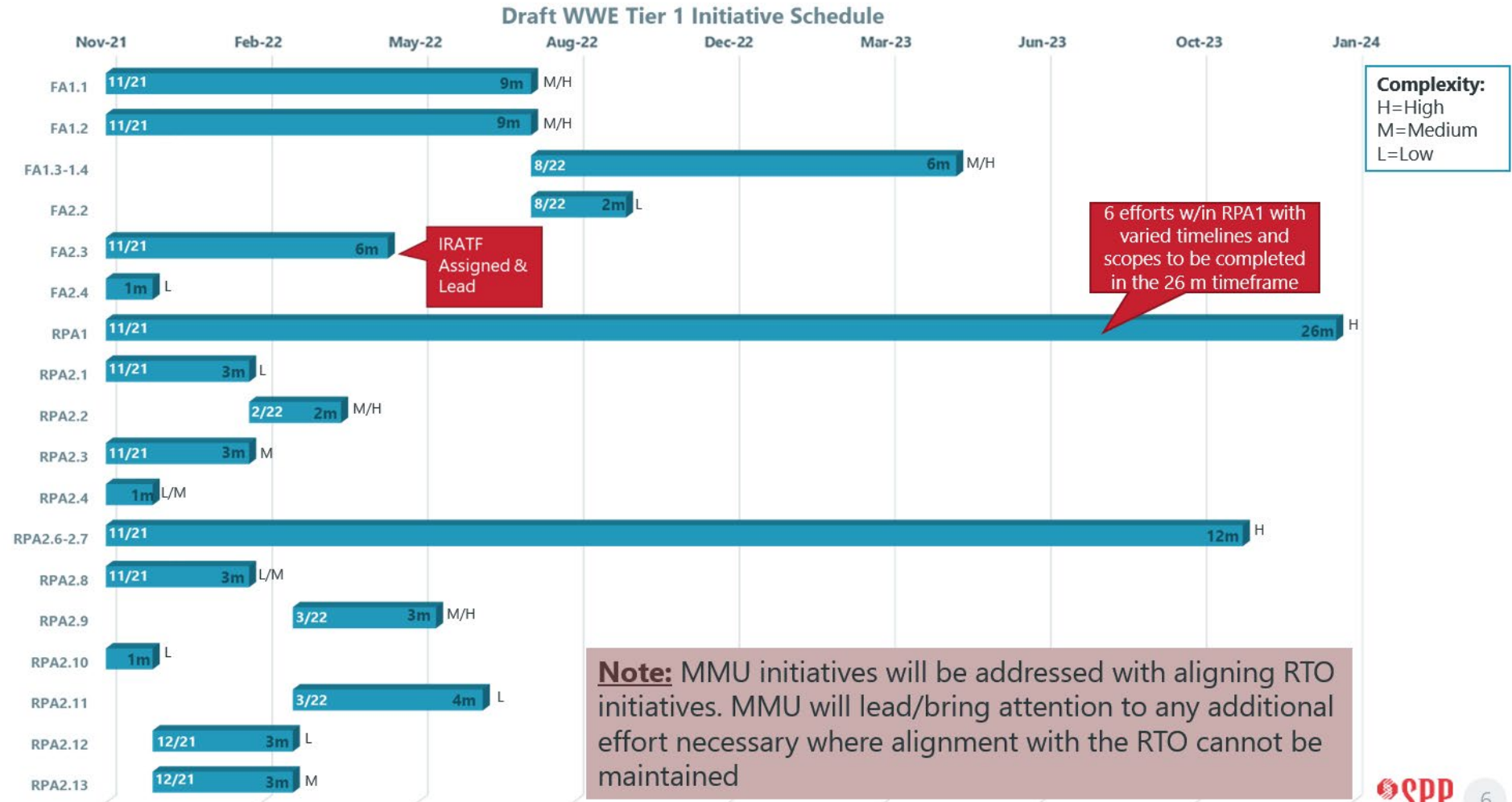
- Assess need for a **waiver of credit-related provisions** in the tariff
- Evaluate **effectiveness of SPP's credit risk policy** during extreme system events

High Level Next Steps

Communications

- Update [SPP's Emergency Communications Plan](#) annually
- Evaluate and propose needed [enhancements to communications tools and channels](#)
 - SPP's website
 - Development of a mobile app
 - Automation of communications processes

SPP Timeline for Analyzing Tier One Issues



NERC Mandatory Standards for Generators

- FERC Approved **New NERC Reliability Standards** August 24th
- Modified three standards:
 - Emergency Preparedness and Operations
 - Reliability Coordinator Data Specification and Collection
 - Operational Reliability Data

Emergency Preparedness and Operations

- Generator owners and operators will be required to develop and implement cold weather preparedness plans that include
 - Freeze protection measures (protect cold weather-critical components and build new or retrofit existing units so they can run during extreme temperatures)
 - Annual inspection and maintenance of generating unit freeze protection measures
 - Generating unit operating limitations in cold weather to include
 - Capability and availability
 - Fuel supply and inventory
 - Fuel switching capabilities
 - Environmental constraints
 - Generating unit minimum
 - Design temperature
 - Historical operating temperature
 - Current cold weather performance
 - Standard also includes training for maintenance and operations personnel on the updated plans

Reliability Coordinator Data Specification and Collection and Operational Reliability Data

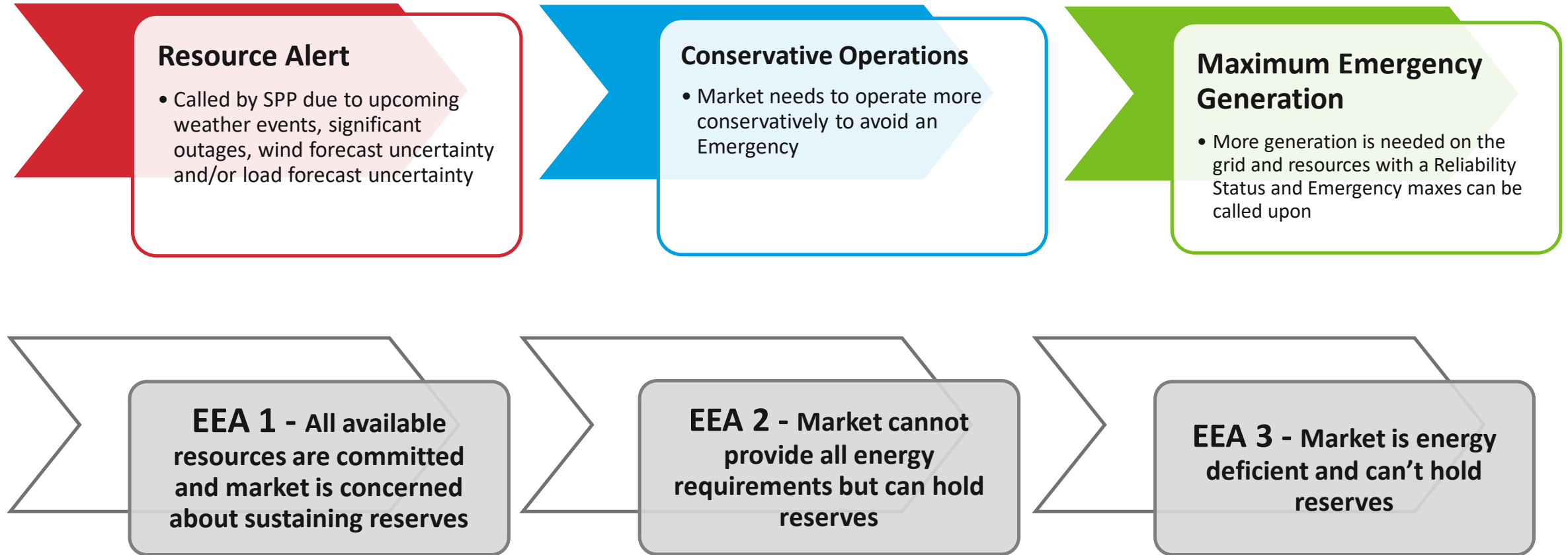
- Basin must supply reporting on Winter Preparedness plans to Reliability Coordinator, Multiple Transmission Operators and Balancing Authorities
- **All standards effective April 1, 2023 but entities are encouraged to comply earlier if possible**

Basin Marketing Action Items



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Basin Communication to Membership



Once an EEA 1 or above is breached in any market that Basin Electric participates in, notifications will be sent to the Membership.

Basin Marketing Cold Weather Checklist

- ✓ Communication with Management and Operations
- ✓ Review Physical Plant Parameters with Operations
- ✓ Confirm Derates and Outages
- ✓ Review Unit Minimums
- ✓ Bridge Natural Gas Runs
- ✓ Work with gas and oil units to ensure fuel and demineralized water purchases
- ✓ Review Strategies
 - ✓ Fuel Switching
 - ✓ WAPA Peaking Utilization
 - ✓ Basin Controlled Load Management
 - ✓ Tie Flows



Discussion