



MISO

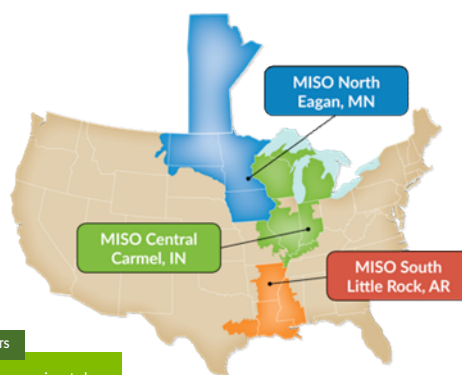
Arctic Weather Event

Daryl Brown
Executive Director
MISO South Region
March 2nd, 2021

The slide features a blue and white geometric design on the left with a circular logo containing a stylized sun and green landscape. A grey arrow points from this logo towards the right, where the title and speaker information are located.

MISO is responsible for delivering safe, reliable and economic power across the high-voltage electric transmission system

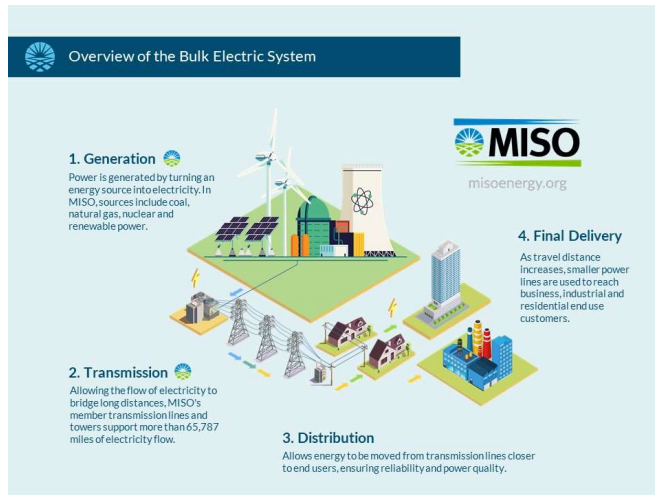
- 15 states and one Canadian Province
- 42 million end-use customers
- 175,000 MW* of generation
- 65,800 miles of transmission lines
- ~ 180 members
- ~ 471 market participants



QUANTITATIVE BENEFITS
MISO provides approximately **\$3.5 billion in annual benefits** to members



MISO's Role as Reliability Coordinator



What is load shed and how/when does it occur?



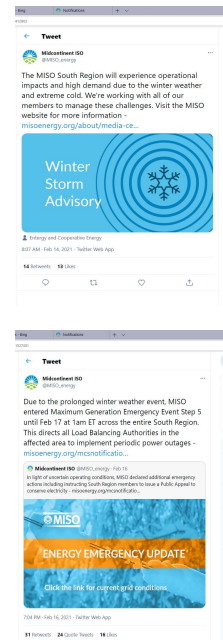
Communication Timeline

February 13-15

- 02/13/2021 00:00 EST Cold Weather Alert
- 02/14/2021 12:00 EST Conservative Operations
- 02/15/2021 09:00 EST MISO Capacity Advisory for the South Region
- 02/15/2021 07:00 EST MISO South Region Max Gen ALERT
- 02/15/2021 18:00 EST South Region Max Gen Warning
- 02/15/2021 18:00 EST Max Gen Event - EEA 2
- 02/15/2021 18:00 EST MISO is EXTENDING Max Gen Event - EEA 2

February 16-17

- 02/16/2021 00:00 EST MISO South Region Max Gen Warning
- 02/16/2021 08:00 EST Max Gen Event - EEA 2
- 02/16/2021 07:30 EST North/Central Region Max Gen Event - EEA 1
- 02/16/2021 07:30 EST Max Gen Event 1b - EEA 1 for North/Central Region
- 02/16/2021 13:32 PM Extending South Region Max Gen Event - EEA 2
- 02/16/2021 14:00 EST North and Central Max Gen Termination
- 02/16/2021 18:35 EST Max Gen Event - EEA 2
- 02/16/2021 19:40 EST Max Gen Event - EEA 3 (Load Shed Notice)
- 02/16/2021 22:00 EST Max Gen Event - EEA 2
- 02/17/2021 00:00 EST Max Gen Event - EEA 0



MISO's Emergency Actions



General Guide to MISO's Emergency Operations Messaging

MISO's Emergency Operations messages define the area(s) involved, duration, and projections of system conditions. The table below is a summary, and does not replace or redefine MISO's Emergency Operations messages.

Message	Communication Intent	Potential Member/MISO Actions
Conservative Operations Declaration	Alert for Situational Awareness: Reliability issue possible for defined area.	<ul style="list-style-type: none"> • Potentially suspend transmission maintenance • Review outage plans for deferral, cancellation
Hot Weather, Cold Weather or Severe Weather Alert	Alert for Situational Awareness: MISO could be approaching tight supply conditions.	<ul style="list-style-type: none"> • Review outage plans for deferral, cancellation
Capacity Advisory	Advisory for Situational Awareness: Potential for limited operating capacity margins (<5%) in the next 2-3 days.	<ul style="list-style-type: none"> • Update facility and generation outages, including tie-rates • Update generation offers • Update Load Forecast Values • Update LMR Availability and Self Scheduled MW values • Update EDR offers
Min Gen Alert	Alert for Situational Awareness: MISO is forecasting a potential supply surplus.	<ul style="list-style-type: none"> • Prepare for de-commitment (taking generation off line), reduction in purchases or other actions
Max Gen Alert	Alert for Situational Awareness: MISO is forecasting a potential capacity shortage.	<ul style="list-style-type: none"> • Declare Conservative System Operations • Prepare for possible Max Gen Event
Max Gen Warning	Warning to Prepare for Possible Event	<ul style="list-style-type: none"> • Curtail non-firm exports • Schedule all available external resources into the MISO Market • Implement Emergency Pricing Offer Tier 1. This is an ex-post pricing change, and does not affect system commitment or dispatch.
Max Gen Event (Step 1)	Actions Taken to Preserve Operating Reserves: NERC Emergency Alert 1	<ul style="list-style-type: none"> • All available resources in use • Generators instructed to start off-line resources. • Use of reserves not yet implemented. • Emergency Pricing Offer Tier 1 is still effective.
Max Gen Event (Steps 2, 3, 4)	Actions Taken to Preserve Firm Load: NERC Emergency Alert 2 (Step 3 declaration)	<ul style="list-style-type: none"> • Implement demand management programs • Utilize Contingency Reserves • Purchase Emergency Energy • Issue Public Appeals • Prepare for possible firm load shed • Implement Emergency Pricing Offer Tier 2. This is an ex-post pricing change, and does not affect system commitment or dispatch.
Max Gen Event (Step 5)	Event Occurring: NERC Energy Emergency Alert 3	<ul style="list-style-type: none"> • Shed firm load • Rolling brownouts or blackouts for defined area • Emergency Offer Tier 2 is still effective.