



KENTUCKY MUNICIPAL ENERGY AGENCY



June 10, 2021 MISO Curtailment

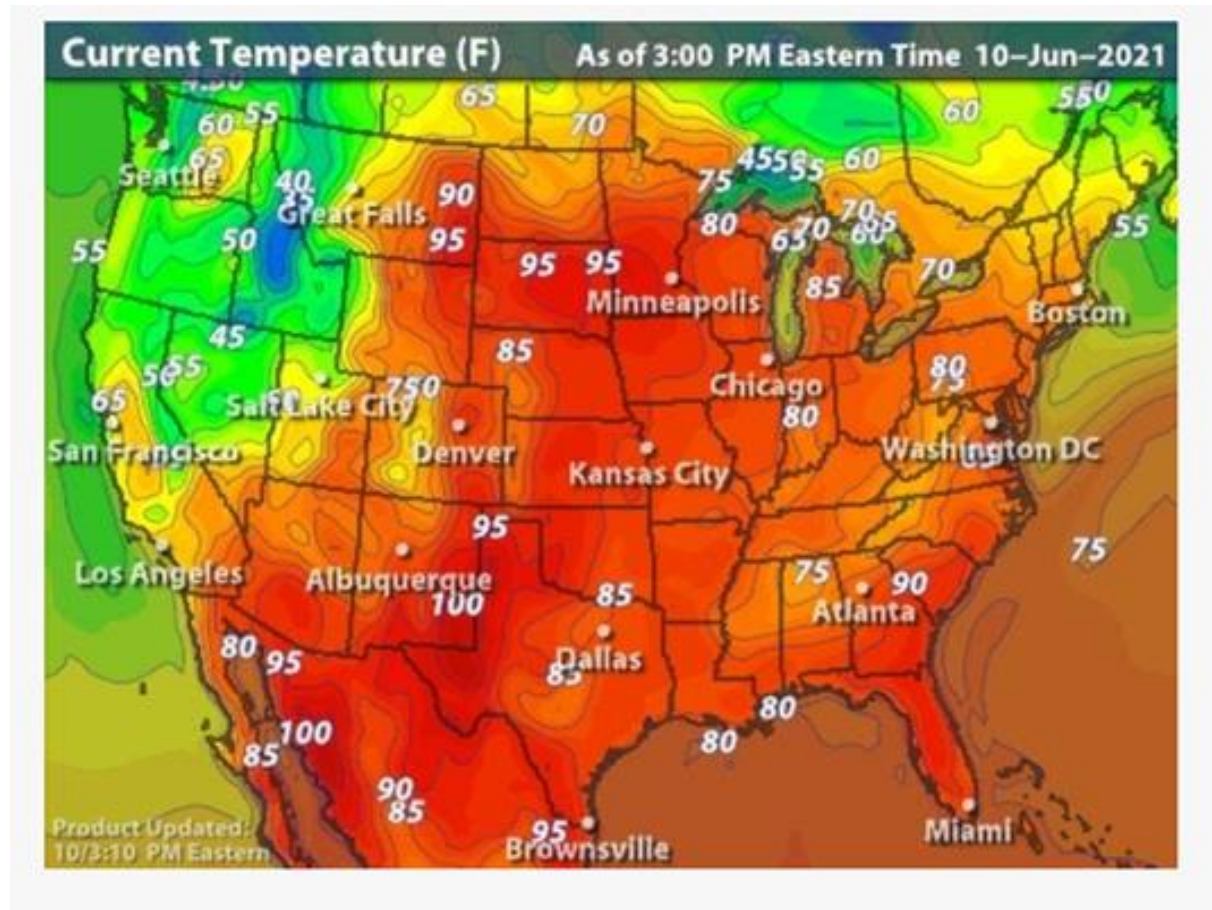
Rob Leesman

June 24, 2021

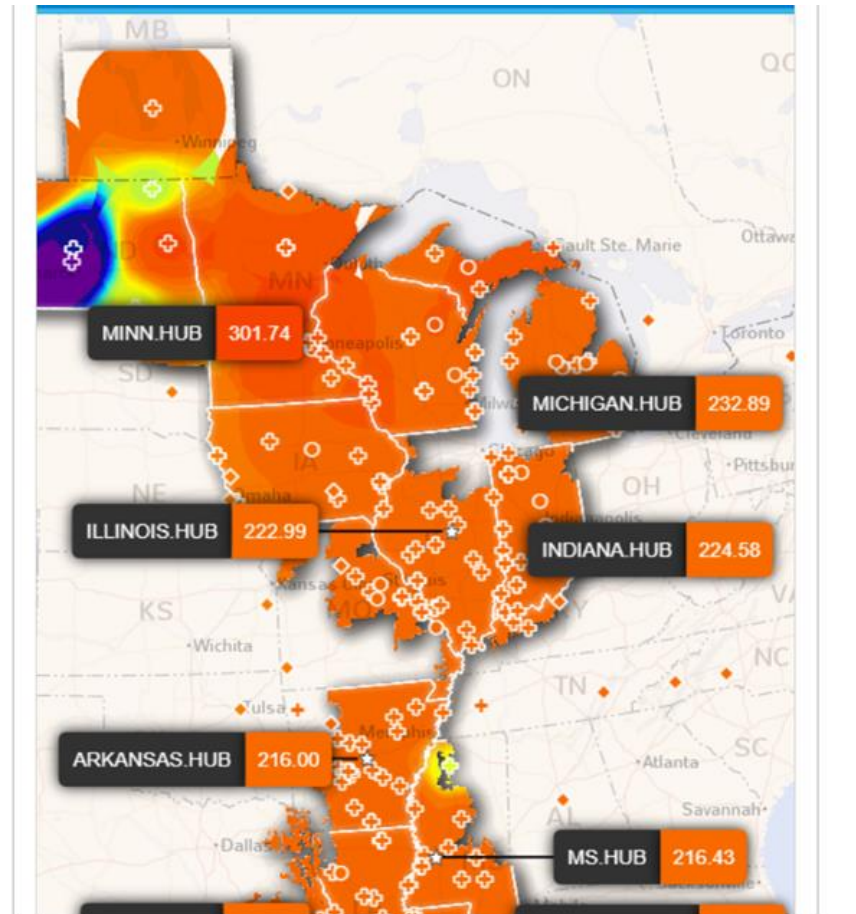
MISO Curtailment

- On June 10, 2021, MISO curtailed exports due to a NERC EEA level 2 event caused by forced generation outages, above normal temperatures and higher than forecasted load.
- As a result of such actions, KYMEA's energy schedules out of MISO were curtailed to 0MW for HE 15 through HE 18.
- KYMEA was able to adjust schedules accordingly to mitigate the curtailment.

June 10, 2021 3:00 PM Temperatures



June 10, 2021 MISO LMPs



NERC Energy Emergency Alerts

1. EEA 1 — All available generation resources in use.

Circumstances:

- The Balancing Authority is experiencing conditions where all available generation resources are committed to meet firm Load, firm transactions, and reserve commitments, and is concerned about sustaining its required Contingency Reserves.
- Non-firm wholesale energy sales (other than those that are recallable to meet reserve requirements) have been curtailed.

NERC Energy Emergency Alerts

2. EEA 2 — Load management procedures in effect.

Circumstances:

- The Balancing Authority is no longer able to provide its expected energy requirements and is an energy deficient Balancing Authority.
- An energy deficient Balancing Authority has implemented its Operating Plan(s) to mitigate Emergencies.
- An energy deficient Balancing Authority is still able to maintain minimum Contingency Reserve requirements.

NERC Energy Emergency Alerts

EEA 3 — Firm Load interruption is imminent or in progress.

Circumstances:

- The energy deficient Balancing Authority is unable to meet minimum Contingency Reserve requirements.

June 10, 2021 MISO EEA 2

Max Gen Event North and Central Regions - EEA 2 effective 06/10/2021 14:00 EST - 6/10/2021 1:43 PM

SHARE

Current NERC EEA Level = 2

Current MISO Max Gen Level = Event Step 2a

Current Emergency Pricing Level = Tier 2

Reliability Actions:

The MISO Reliability Coordinator is declaring a Maximum Generation Emergency Event Step 2a effective from 06/10/2021 14:00 EST until 06/10/2021 18:00 EST for the following entities: Central Region area(s) of: ALT, ALTE, AMIL, AMMO, AMRN, ATC, BREC, CIN, CONS, CWLD, CWLP, DECO, GLH, HE, HMPL, IPL, ITC, MECS, METC, MGE, MIUP, NIPS, PION, RTX, SIGE, SIPC, UPPC, WEC, WPS and North Region area(s) of: ALTW, DPC, GRE, ITCM, MDU, MEC, MP, MPW, NSP, OTP, SMP

The reason for the Event is because of Forced Generation Outages, Above Normal Temps, Higher than Forecasted Load.

The MISO Reliability Coordinator instructs the following:

Stakeholder Major Actions	Max Gen Step Level
As directed by MISO, LBAs reduce load via LMM - Stage 1	2a
As directed by MISO, MPs implement LMRs via MCS-LMR Tool	2a
MPs review Offers and ensure all available Emergency ranges and Resources are offered	1b
As directed by MISO, LBAs/GOPs/MPs start AME Resources	1a
MPs update EDR availability and MW amounts	Warning
LBAs update LMM availability via Load Management Form in the MCS	Warning
MPs ensure LMR availability data is correct in the MCS-LMR tool	Warning
MPs schedule available Module E Resources into the declaration area	Warning
As directed by MISO RC, TOPs implement reconfiguration options	Warning
MPs communicate available Module E Resources	Alert
MPs update energy interchange transaction E-Tags of Capacity Resources	Alert
LBA/TOP provide potential exclusion of constrained pockets within the declaration area	Alert
TOPs coordinate with MISO RC to identify potential reconfiguration options	Alert
LBAs/MPs ensure accuracy of LMM/LMR availability and Self Scheduled values in MCS	Alert
Affected GOPs communicate capacity limited facilities to MISO and update limits and offers	Alert
Prepare to implement this procedure and follow procedures for emergency conditions	Capacity Advisory
Follow instructions per Conservative System Operations procedure and declaration	Capacity Advisory
If notified by MISO, Implement LMRs	Capacity Advisory

June 10, 2021 MISO EEA 2

Real-Time Operations

Receive notifications related to real time operations such as weather alerts, maintenance that may impact operator systems or tools, emergency operating conditions, operator drills, and issues impacting the open or close of the Day-Ahead and Real Time markets.

Hot Weather Alert Termination effective 06/10/2021 23:00 EST - 6/10/2021 10:59 PM +

Conservative Operations Termination effective 06/10/2021 20:00 EST - 6/10/2021 7:50 PM +

Capacity Advisory Termination effective 06/10/2021 20:00 EST - 6/10/2021 7:50 PM +

Max Gen Termination effective 06/10/2021 18:00 EST - 6/10/2021 5:41 PM +

Max Gen Alert effective 06/10/2021 17:00 EST - 6/10/2021 5:02 PM +

EEA 2

Max Gen Event North and Central Regions - EEA 2 effective 06/10/2021 14:00 EST - 6/10/2021 1:43 PM +

Max Gen Warning North and Central Regions effective 06/10/2021 13:00 EST - 6/10/2021 9:40 AM +

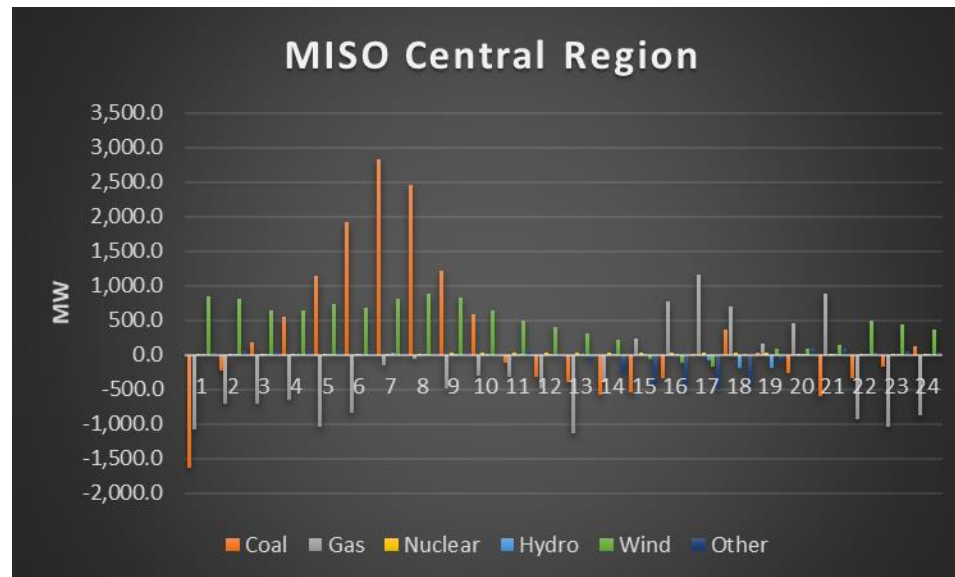
MISO declares Conservative Operations for Central and North Regions (see summary for detail) effective 06/10/2021 08:00 EST - 6/10/2021 7:51 AM +

Max Gen Alert for NORTH and CENTRAL Regions effective 06/10/2021 13:00 EST - 6/10/2021 7:44 AM +

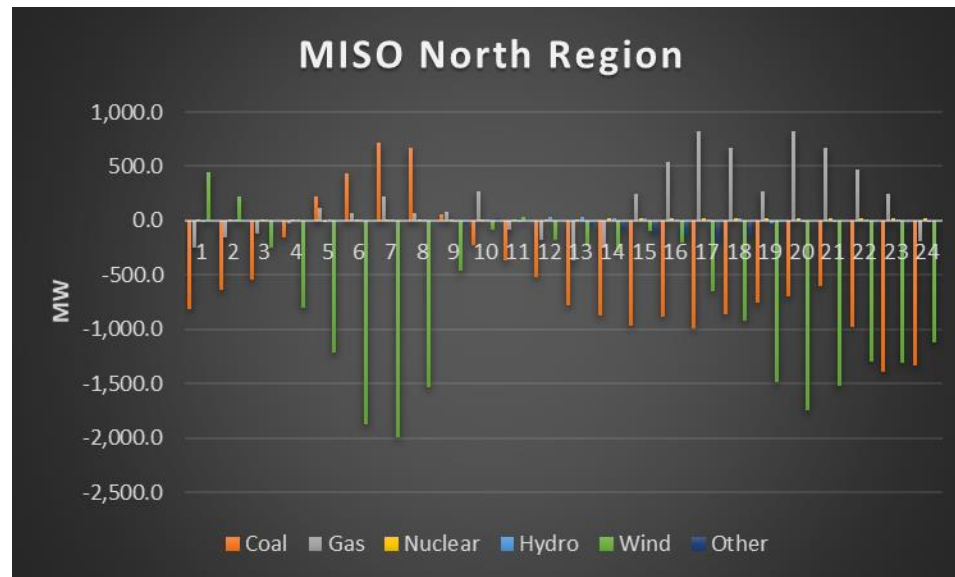
MISO is expanding the Capacity Advisory to the MISO Market Footprint effective 6/10/2021 at 10:00 EST - 6/9/2021 4:55 PM +

Capacity Advisory effective 06/10/2021 10:00 EST for MISO North and Central Regions only - 6/9/2021 10:43 AM +

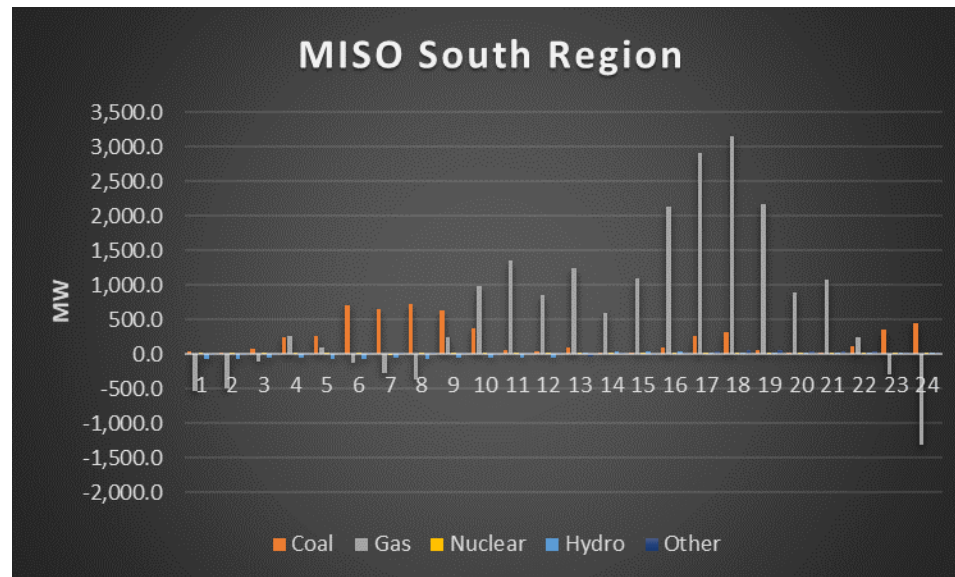
MISO Day-Ahead vs Real-Time Supply



MISO Day-Ahead vs Real-Time Supply

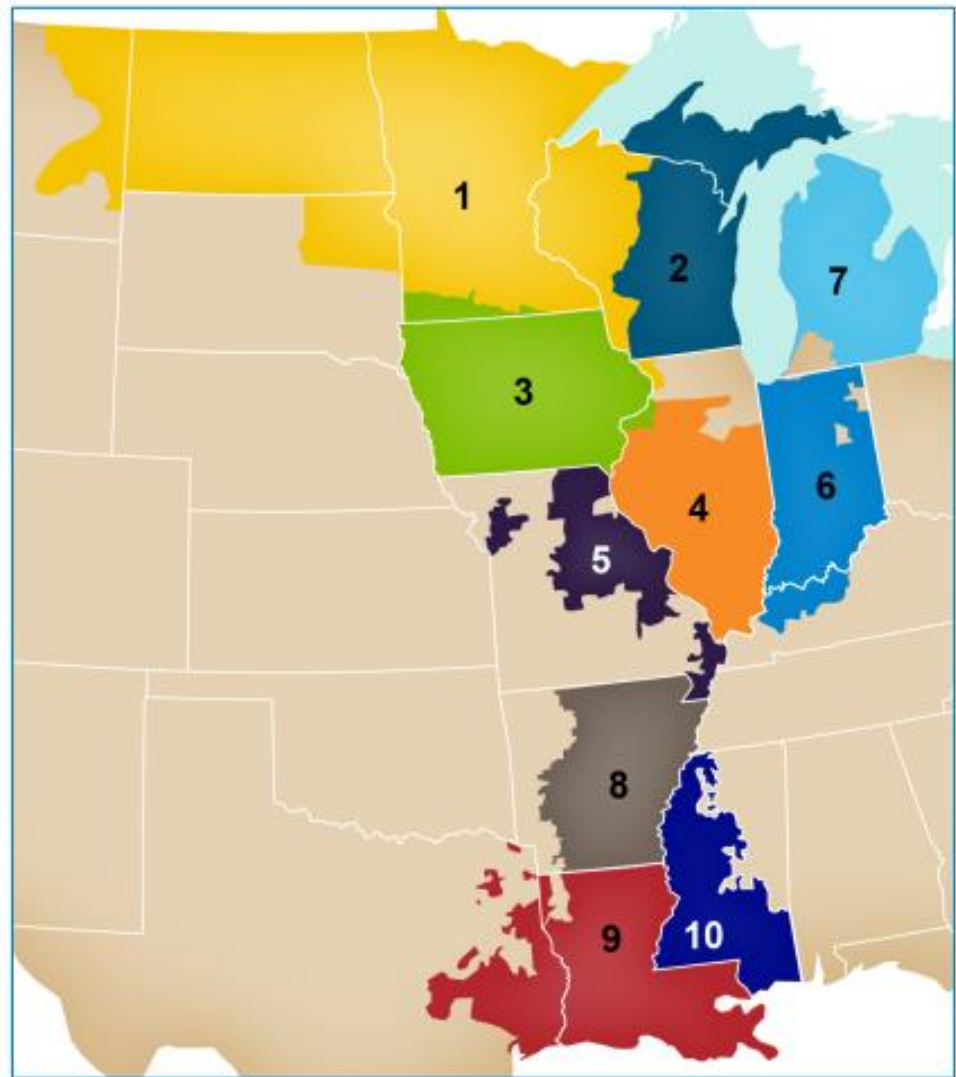


MISO Day-Ahead vs Real-Time Supply



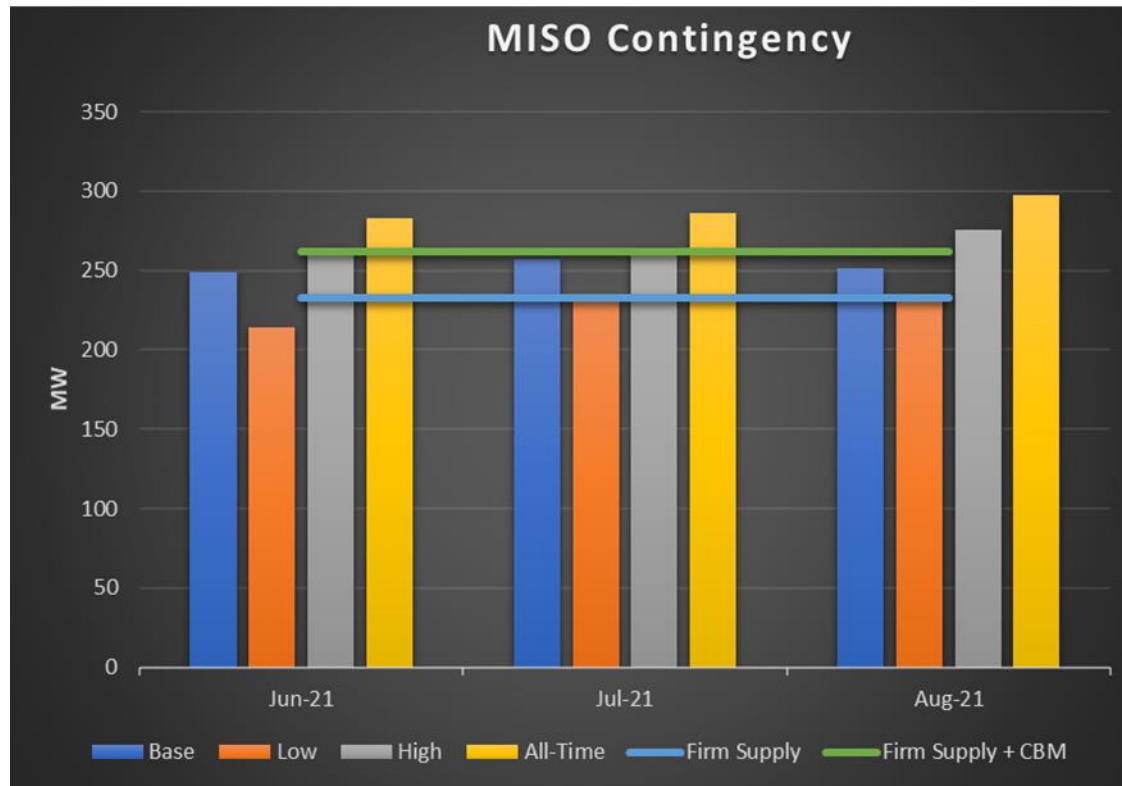
MISO Local Resource Zones

Central Region (LRZs 2,4,5,6 and 7)
North Region (LRZs 1 and 3)
South Region (LRZs 8,9 and 10)



What If?

- As mentioned above, KYMEA was able to mitigate the curtailment by adjusting other schedules, but what if that was not an option?



Available Levers

- The chart above represents a MISO contingency where all schedules out of MISO are cut and subsequently based upon the base peak load forecast would create a supply deficiency.
- Available levers to pull to mitigate the deficiency include:
 - Calling upon CBM, which would require LG&E/KU to have available resources. (29MW)
 - Exporting power out of PJM which would require transmission service and ramp availability.
 - Importing power from the TVA and EEI interfaces which would require transmission service and resource(s).
 - Calling on customers for conservative operations.
 - Coordinated load curtailment via the 2021 KYMEA Curtailment Plan.
 - Load curtailment instructed/executed by LG&E/KU. (no control)

2021 KYMEA Curtailment Plan

- Updated yearly based upon the previous year's KYMEA coincident peak with LG&E/KU.
- Four steps, each step is estimated to curtail 10% of KYMEA's load.

CP Step	Estimated Load (MW)
1	27.85
2	28.78
3	29.33
4	27.84

Total>> 113.81

**** 2020 Peak 267.04 MW**

Next Steps

- Schedule roundtable discussions surrounding the curtailment plan process with KYMEA members, KYMEA staff and ACES.
 - Discuss procedure(s)
 - Verify contacts
- Setup a trial run.