Watchlist for MISO's 2021-22 auction

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ICF expects the upcoming MISO capacity auction results to once again be lackluster. Assuming bidding behavior in the next auction is similar to the most recent (2020-21) auction, ICF expects capacity prices will clear between $1/MW-day and $5/MW-day, without any zonal separation. Although local capacity in MISO North could be less than the previous auction, the prices are expected to remain low due to lower demand and higher import capabilities. The following factors are expected to impact the upcoming auction:

- Key downside factors: Decrease in peak demand, increase in capacity import limits, increase in local capacity in zones 5, 7 and 9, and decrease in local clearing requirement for most of the zones.
- Key upside factors: Increase in planning reserve margin, decrease in local capacity in zones 4 and 6, and increase in local reliability requirement for select zones.

The lack of an effective market mechanism to provide adequate payments will likely keep prices low going forward. However, the structure of MISO's capacity market, which employs a vertical demand curve as compared to the sloped demand curve used in PJM and ISO-NE, supports extreme volatility and can result in high prices in some zones if it binds on local capacity requirements or if the requirements are not met.

With more than 20 GWs of thermal retirements expected within the next few years, MISO will experience increasingly tight supply and demand balance. However, these conditions may not necessarily increase capacity prices in the auctions. ICF believes that utilities in MISO will continue to self-procure and the capacity market will remain a balancing market.

Introduction

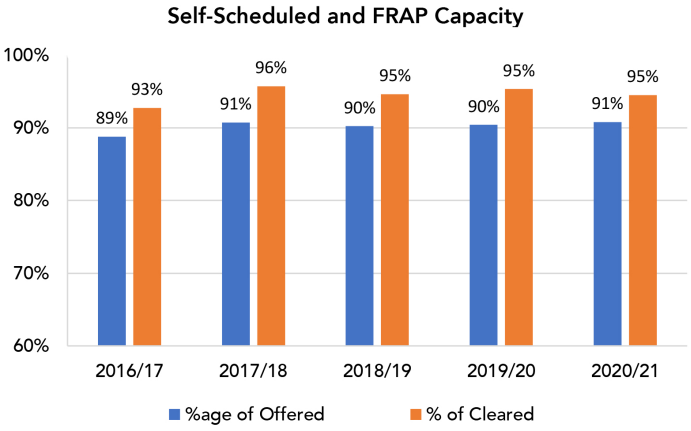
MISO's ninth capacity auction for planning year 2021-22 (covering June 2021 to May 2022) is expected to take place in the first half of April. ICF expects that capacity prices in the upcoming auction will be lower than the previous auction, clearing between $1/MW-day and $5/MW-day, without any zonal separation.

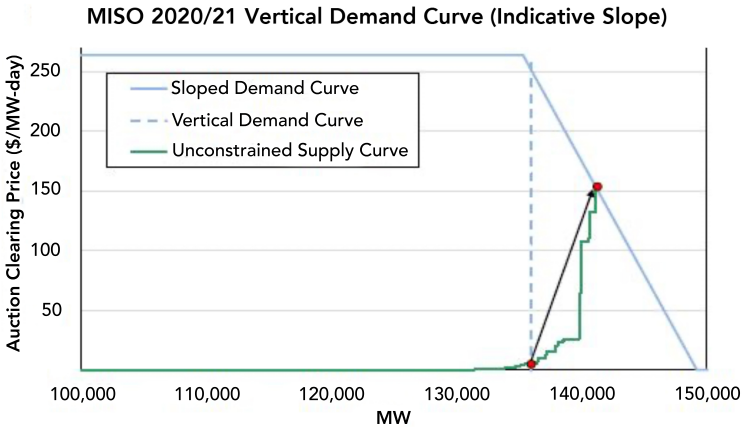
Load serving entities (LSEs) are required to participate in the MISO capacity market auctions. LSEs must meet two reserve requirements in capacity auctions: The Planning Reserve Margin Requirement (PRMR)[1] and the Local Clearing Requirement (LCR)[2]. The PRMR is the amount of capacity a zone must procure (locally and through imports) to fulfill its share of MISO's peak requirements. The LCR is the amount of capacity a zone must procure locally to meet its own peak requirements. Reflective of major transmission constraints, MISO has defined ten local resource zones (LRZs) with capacity import and export limits and local reliability requirement (LRR). The LSEs can procure resources to meet these requirements either through self-supply, bilateral contracts, or through capacity auction purchases.

Since MISO's first capacity auction, resulting prices have been persistently low mainly due to:

- The use of a vertical demand curve that ascribes "zero" value to any excess capacity. As shown in Exhibit 1, the vertical demand curve can result in very low prices even when the system is slightly oversupplied. The IMM simulated the 2020-21 auction using a sloped demand curve concluding that auction price with sloped demand curve could have been 30 times higher price (~$150/MW-day vs. $5/MW-day).
- Significant amount of capacity is owned or contracted by utilities. This capacity bids at a zero or near zero price undermining the likelihood of meaningful results, in terms of the market's ability to stimulate new merchant investment in generation. As shown in Exhibit 1, ~90% of the total offered capacity and ~95% of the capacity cleared is either self-scheduled or sourced as Fixed Resource Adequacy Plan (FRAP).

EXHIBIT 1: SELF-SCHEDULED AND FRAP CAPACITY AND IMPACT OF A DEMAND CURVE IN MISO AUCTION





Source : ICF using MISO auction results, MISO 2019 State of Market Report (released Jun 2020)

EXHIBIT 2: MISO PLANNING RESOURCE AUCTION - HISTORICAL RESULTS ($/MW-DAY)

Zone	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Zone 1	• 1.1	• 3.3	• 3.5	• 19.7	• 1.5	• 1.0	• 3.0	• 5.0
Zone 2		• 16.8		• 72.0		• 10.0		
Zone 3								
Zone 4			• 150.0					
Zone 5			• 3.5					
Zone 6								
Zone 7							• 24.3	• 257.5
Zone 8	• N/A	• 16.4	• 3.3	• 3.0			• 3.0	• 4.8
Zone 9	• N/A	• N/A						• 6.9
Zone 10	• N/A	• N/A	• N/A					• 4.8

Source : MISO auction results

[1] PRMR is calculated as Gross Peak Load x UCAP Reserve Margin (%)

[2] LCR is defined as Local Reliability Requirement (LRR) – Capacity Import limit (CIL)

Recap of previous 2020-21 auction

Exhibit 3 below summarizes 2020-21 auction results where zones 1-6 cleared at $5/MW-day, zones 8 and 10 cleared at $4.75/MW-day, and zone 9 cleared at $6.88/MW-day. Compared to the previous two auctions, zone 7 had a lower capacity import limit resulting in higher local clearing requirement (at 99.6% of its PRMR, zone 7's LCR was the highest across all zones). In addition to this, a change in methodology that accounted for outages in 2020-21 auction disqualified nearly 340 MW of local capacity, resulting in a local capacity shortage. This led zone 7 to clear higher than all other zones at a net CONE of $257.53/MW-day.

MISO South cleared separately reflecting a binding sub-regional export limit from South to North. Within MISO South, zone 9 cleared higher than zones 8 and 10. Similar to zone 7, because of its relatively low effective capacity import limit or high LCR, zone 9 could not import enough capacity and had to rely on local capacity to meet its local clearing requirements.

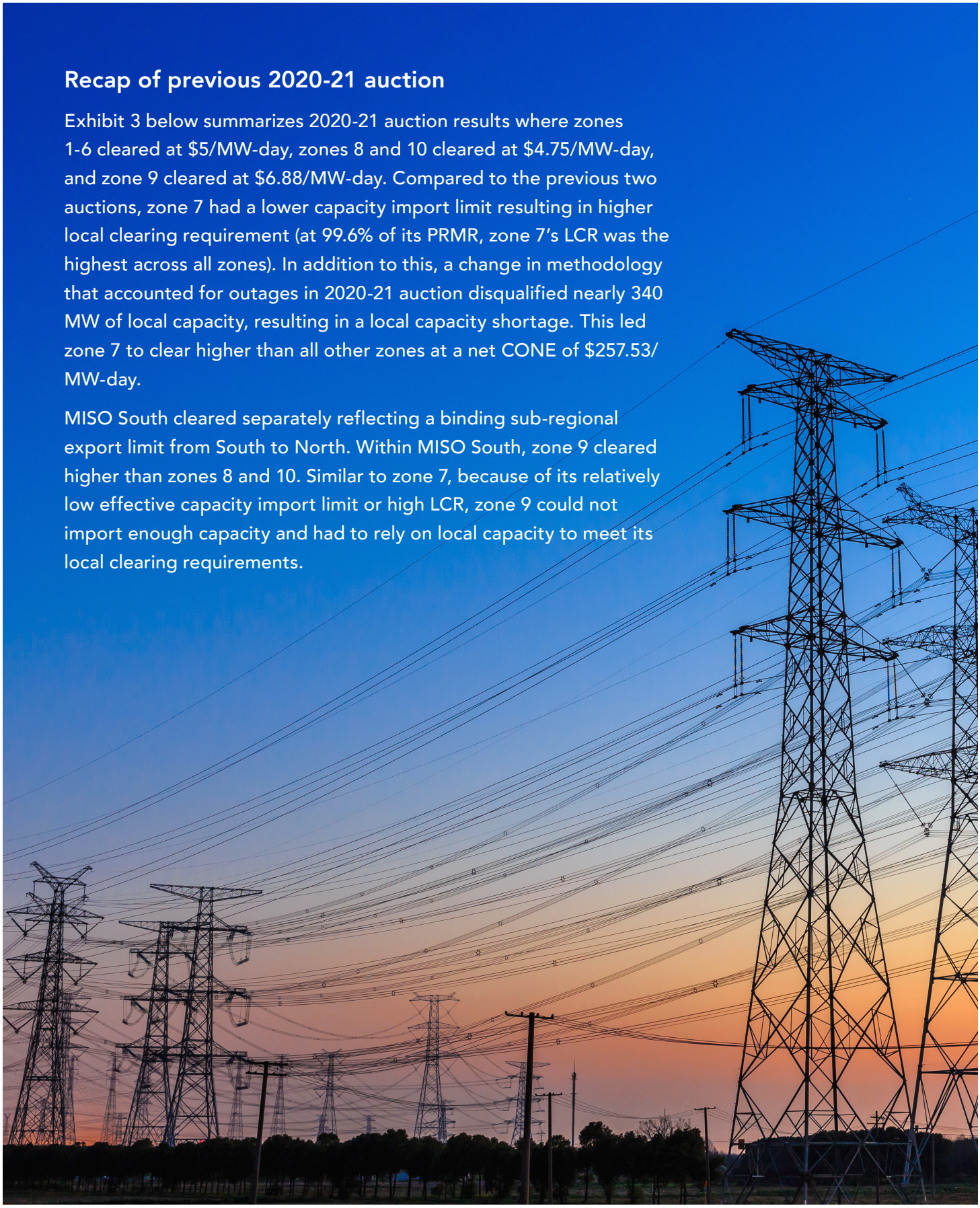


EXHIBIT 3: PLANNING YEAR 2020-21 AUCTION RESULTS

PY 2020-2021	1	2	3	4	5	6	7	8	9	10	MISO
PRMR	18.5	13.7	10.1	9.8	8.5	18.7	21.9	8.0	21.7	5.0	136.0
Local Cleared	18.7	13.6	10.6	8.5	8.0	17.1	21.7	10.2	20.9	5.2	136.0
LCR	17.1	13.3	7.7	6.7	4.5	12.8	21.9	6.2	20.9	3.7	
CIL	2.9	1.6	3.3	6.0	5.4	7.3	3.2	3.8	3.4	3.2	
Imports	0.0	0.1	0.0	1.3	0.5	1.7	0.2	0.0	0.8	0.0	4.7
Price ($/MW-day)	5.0	5.0	5.0	5.0	5.0	5.0	257.5	4.8	6.9	4.8	
LCR as % of PRMR	92.3%	97.1%	75.7%	68.9%	52.7%	68.3%	99.6%	78.2%	96.2%	73.3%	0.0%
Effective Import limit [PRMR – LCR]	1.4	0.4	2.5	3.1	4.0	5.9	0.1	1.7	0.8	1.3	

What has changed since the previous auction?

Several auction parameters have changed since the last auction. Some will result in downward pressure whereas others will tend to exert upward pressure on prices. As discussed below, ICF expects the downward pressure from lower demand and lower LCR to offset the upward pressure from other parameters, resulting in lower capacity prices.

Exhibit 4 below summarizes the impact of key market changes/drivers on the upcoming 2021-22 capacity auction and the following section discusses the impact of each of these parameters.

EXHIBIT 4: IMPACT OF KEY AUCTION DRIVERS ON 2021-22 AUCTION

Parameter	Impact on Auction Capacity Price
Higher planning reserve margin (%) and outages	• Upward
Lower peak demand	• Downward
Higher LRR in zones 7, 8 and 10	• Upward
Higher CIL and lower LCR in zones 7 and 9	• Downward
Capacity additions	• Downward
Higher retirements/outages	• Upward

EXHIBIT 5: SUMMARY OF CHANGES IN KEY AUCTION PARAMETERS BETWEEN 2020-21 AND 2021-22 AUCTION

Auction	Parameters	1	2	3	4	5	6	7	8	9	10	MISO
PY2020/21	Peak Load	17.0	12.6	9.3	9.0	7.8	17.2	20.2	7.3	19.9	4.6	124.9
	PRM (%)						8.90%					
	PRMR	18.5	13.7	10.1	9.8	8.5	18.7	21.9	8.0	21.7	5.0	136.0
	LRR	114%	117%	115%	129%	124%	115%	120%	133%	116%	146%	
	CIL	2.9	1.6	3.2	5.1	5.4	7.3	3.2	3.8	3.4	3.2	
	LCR	17.1	13.3	7.7	6.7	4.5	12.8	21.9	6.2	20.9	3.7	
PY2021/22	Peak Load	16.8	12.4	9.4	9.0	7.5	16.6	19.6	7.2	19.5	4.4	122.4
	PRM (%)						9.40%					
	PRMR	18.4	13.6	10.3	9.9	8.2	18.1	21.5	7.8	21.3	4.8	133.9
	LRR	115%	115%	117%	127%	125%	115%	121%	136%	116%	153%	
	CIL	5.1	3.6	4.6	5.1	4.4	7.0	4.9	5.2	4.1	3.3	
	LCR	14.9	10.7	6.7	6.5	5.3	12.2	19.7	5.0	19.4	3.6	
Delta	Peak Load	-0.2	-0.2	0.1	0.0	-0.2	-0.6	-0.5	-0.2	-0.5	-0.2	-2.5
	PRM (%)						0.50%					
	PRMR	-0.1	-0.1	0.2	0.1	-0.2	-0.6	-0.5	-0.2	-0.4	-0.2	-2.1
	LRR	0.5%		2.1%	-2.3%	1.0%	-0.2%	1.7%	3.1%		6.8%	
	CIL	2.2	2.0	1.4	0.0	-1.0	-0.3	1.7	1.4	0.7	0.1	
	LCR	-2.2	-2.7	-1.0	-0.3	0.8	-0.6	-2.1	-1.3	-1.5	-0.1	

Higher PRM. MISO determines a minimum Planning Reserve Margin (PRM) designed to limit a one-day loss of load event (LOLE) from occurring no more than once in every 10-year period. For 2021-22, the LOLE study set UCAP PRM to 9.4% which is 0.5% higher than the previous auction's PRM of 8.9%. All else equal, higher PRM should result in higher capacity procurement and higher prices. This increase is largely due to use of realistically planned outage approach, which resulted in a nearly 1% increase. This increase is partially offset by modeling of monthly wind capacity credit and other resource mix changes.

Lower peak demand offsets higher PRMR. ICF expects lower demand to be the major driver, putting downward pressure on auction clearing prices. Relative to the previous auction, the coincident peak load forecast for PY 2021-22 is nearly 2% (or 2.5 GW) lower with demand in MISO-South and MISO-North lower by nearly 3% and 1.7%, respectively. The decrease in demand can be largely attributed to the COVID pandemic. This decrease in demand more than offsets the increase due to higher PRM and so overall capacity requirement is lower by nearly 1.5% (2 GW).

Higher LRR offset by lower peak demand. The zonal Local Reliability Requirements (LRRs) for the upcoming auction are generally close to the previous auction except for zones 7, 8 and 10, where it is 2 to 7% higher. All else equal, higher LRR results in higher Local Clearing Requirements (LCR) supporting higher prices due to increasing reliance on local capacity. However, the impact of higher LRR is offset by lower peak demand. LRR is also impacted by the modeling of outages. MISO has currently estimated LRR using perfectly optimized outage approach. However, MISO's initial analysis of realistically optimized outage approach suggested higher LRR.

Higher CIL results in lower LCR in zones 7 and 9. Capacity Import Limits (CIL) significantly impacts LCR – High-capacity import decreases local capacity requirements. For the 2021-22 auction, CIL is higher for zones 1-3 and 7-9. As discussed before, in the last auction, zone 7 cleared at net CONE as it had high LCR, but it was short of local capacity. With a higher import limit, LCR for zone 7 will decrease, causing it to clear well below the deficiency price or net CONE. Similarly, zone 9 was binding on its LCR in the last auction. While LRR for zone 9 is largely similar, its LCR is now lower due to higher CIL and lower demand and it is not expected to be binding in the upcoming auction.

Higher installed capacity will be partially offset by higher outages. Since the last auction, nearly 3.5 GW of capacity went operational and nearly 1 GW of capacity retired. However, some of this increase is offset by higher outages among other factors resulting in a net capacity increase of 0.3 GW. Compared to the confirmed capacity of the last auction, MISO North has nearly 2 GW less capacity (mostly in zones 4 and 6) whereas MISO South has 2.2 GW more capacity (mostly in zone 9). Depending on the nature of this change in capacity, the impact on capacity prices can be slightly different. There will be no meaningful impact if the decreasing capacity reflects merchant capacity that did not clear the previous auction, however, it may put upward pressure on prices if this change stemmed from FRAP or self-scheduled category because FRAP capacity is accounted at zero price and self-scheduled capacity typically bids at a very low price.

Outlook for 2021-22 auction and future implications

While there are several offsetting parameters going into the upcoming auction, downside drivers are expected to outweigh the upside drivers leading to lower clearing price across all zones without any zonal separation. Lower demand and higher capacity import limits are the most significant downward drivers. Without them, there could be zonal separation similar to that seen in the previous auction.

For the 2021-22 auction, MISO modeled planned outages using a "perfectly optimized outage" approach (based on perfect foresight to avoid high load), but MISO plans to transition to a "realistically optimized outage" approach (based on the average of thirty historical load and outage profiles) in the 2022-23 auction to better capture the planned outages during high load non-summer months. The latter approach is expected to result in higher local reliability requirements.

Considering the magnitude of changes in LRR and need for a proper transition, MISO did not adopt it for the 2021-22 auction. The approach is currently being discussed with stakeholders and MISO plans to implement the "realistically optimized outage" for its 2022-23 LOLE study. If adopted, the new approach is expected to increase the future likelihood of some zones separating and clearing at higher prices.

MISO is expected to see a decline in its reserve margin over the next five years due to expected retirements of over 20 GW of thermal capacity (nearly 80% in MISO-North), with some of this being partially offset by modest demand growth (including higher DSM penetration) and increasing renewable penetration (additional 25 GW). The 2020 OMS survey also highlighted the increasing tightness in several zones and the need for new firm capacity in 2023. Also, based on previous auction and OMS survey, MISO has highlighted zones 1, 2, 4, 7 and 9 as at risk of being potentially short by 2025/26. ICF expects zone 6 to be at risk as well given the expected retirements there in the near- to mid-term.

Looking forward, for the foreseeable future, ICF expects that MISO utilities/LSEs will continue to procure needed capacity either through bilateral contracts or self-scheduled without taking on much exposure on MISO volatile capacity market. In other words, the MISO capacity market is expected to remain a balancing market where utilities will conduct out-of-market capacity procurement and then bid that capacity into the MISO capacity market at zero or near-zero prices to essentially buy/sell any shortfall/excess at price levels non-reflective of a truly merchant capacity value.

Lastly, MISO is currently considering a seasonal or sub-annual resource adequacy construct instead of existing annual resource adequacy construct to address loss-of-load risk or reliability issues it has observed outside the summer period. It would assign seasonal capacity accreditation based on resource availability and conduct a seasonal loss-of-load expectation study based on resource adequacy hours to determine risk across the year. MISO has also proposed a minimum capacity requirement, which would require LSEs to procure at least 50 percent of their requirement before the auctions in tandem with a penalty mechanism for non-compliance. MISO is currently evaluating different options in consideration of stakeholder feedback and plans to finalize a design framework within the next few months and formally move to seasonal auction likely for the PY 2023-24.

About the authors

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Vinay is working as senior manager in ICF's Energy Advisory Group with over ten years of analytics and consulting experience in energy and environmental markets. He is an expert in U.S electricity markets, with focus on ERCOT, MISO, and SPP markets. He has a strong understanding of market design and issues affecting wholesale and retail power markets. He has worked extensively on statistical optimization, power market modeling, due diligence and asset valuation, valuation of power purchase agreements, and financial hedges for thermal/renewable assets and transmission nodal basis risk assessment. He has served on restructuring/bankruptcy cases, development projects, and buy/sell-side valuation projects. Vinay holds an MBA (Honors) in Energy Management from School of Business, University of Petroleum & Energy Studies, India and a B.Tech (Honors) in Mechanical Engineering from Institute of Engineering & Technology, Agra University, India.

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