

KYMEA appreciates the acknowledgement in the Synapse Energy Economics (Synapse) Memorandum that the Integrated Resource Plan (IRP) process demonstrates KYMEA's focused interest in prudent decision-making that is in the best interest of its members and the residents and businesses those members serve. As part of the ongoing IRP process, KYMEA has invited participation and feedback from the public and interested stakeholders. KYMEA welcomes Synapse's participation in this process, but we are concerned that certain elements of the Synapse Memorandum may contribute to public confusion and promote unrealistically rosy expectations, due to some fundamentally mistaken assumptions about KYMEA's market position and the resource alternatives available to it. KYMEA here offers some clarifying facts and explanations.

KYMEA Market Access

Synapse states that KYMEA is surrounded by market opportunities. Specifically, in addition to MISO and PJM, Synapse emphasizes proximity to TVA and non-RTO investor-owned utilities within Kentucky as market opportunities¹.

Synapse's market opportunities statement is not accurate. KYMEA is an island in the middle of the LG&E/KU transmission system with very limited access to MISO and PJM. To gain access to the MISO and PJM markets, very expensive firm transmission rights must be secured, generally years in advance.

Ten of the eleven KYMEA members' load reside in the LG&E/KU transmission service area. One KYMEA member, Falmouth, resides in the PJM (EKPC) service area. The Falmouth load has unencumbered PJM market access allowing KYMEA to purchase power at the PJM EKPC_RESID_AGG commercial pricing node under the EKPC network transmission service.

In contrast, KYMEA members' load in the LG&E/KU service area does not have unencumbered access to RTO markets, and LG&E/KU does not belong to an RTO. As such, KYMEA must acquire, generally, years in advance, firm transmission service to gain access to the MISO and PJM markets. Further, KYMEA has no market opportunity with TVA or non-RTO investor-owned utilities within Kentucky.

Facts

1. Gaining RTO Transmission Access
 - Access to MISO and/or PJM requires firm point-to-point transmission service plus LG&E/KU network service. Transmission access is obtained for a set number of years at a set MW quantity. For example, a 50 MW point-to-point transmission path with MISO for five years would require the following studies.
 - System Impact Study (Both MISO and LG&E/KU)
 - Facilities Study (Study required if system impact study identifies overloading problems)

¹ Synapse Comments Regarding KYMEA's IRP, page 2

- Facilities Upgrades (Equipment capital expenditures such as transformers, line reconductoring, etc. identified to rectify overloading issues)
 - KYMEA cannot simply purchase energy from MISO or PJM without acquiring and paying for RTO point-to-point transmission service. The scheduling of power from the RTOs is further complicated by import/export RTO hourly ramp availability.
- 2. MISO Market
 - RTO Node: MISO LGEE Interface
 - Access to the MISO market requires firm point-to-point transmission service from MISO with charges under MISO tariff schedules² 1, 2, 7, 26, 26a, and 45.
 - As of July 1, 2020, the MISO point-to-point transmission rate is:
 - Monthly Firm: \$4.04 per kW-MO (schedules 1, 2, 7, 26) plus \$1.67 per MWh (schedule 26a)
 1. The equivalent around-the-clock (ATC) firm transmission adder for a 1 MW block purchase is \$7.20/MWh ($4.04 \times 12000 / 8760 + 1.67$).
 2. If KYMEA were to purchase its entire load, including 8.9% reserves from MISO, the firm transmission adder for a load following product is \$12.86/MWh.
- 3. PJM Market
 - RTO Node: PJM South Export
 - Access to the PJM market requires firm point-to-point transmission with PJM tariff schedules³ 1, 2, 6, 7, and 9.
 - As of August 1, 2019, the PJM point-to-point transmission rate is:
 - Monthly Firm: \$4.03 per kW-MO (schedules 1, 2, 6, 9) plus \$0.75 per MWh (schedule 7)
 1. The around-the-clock (ATC) firm transmission adder for a 1 MW block purchase is \$6.27/MWh.
 2. If KYMEA were to purchase its entire load, including 8.9% reserves from PJM, the firm transmission adder for a load following product is \$11.95/MWh.
- 4. TVA Access is Not Available
 - Except for the members' Southeastern Power Administration (SEPA) hydroelectric power entitlement, KYMEA cannot purchase power from TVA due to "The Fence."
 - The Fence Background: In 1959, an amendment was added to the TVA Act⁴, which created a Fence around TVA. The Fence prohibits TVA from selling power to any municipality which received service from another source on or after July 1, 1957. As such, KYMEA and its members cannot purchase from TVA.

² <https://www.misoenergy.org/markets-and-operations/settlements/ts-pricing/#nt=tspricingtype:Schedule%201%20Data>

³ <https://www.pjm.com/library/governing-documents/effective-documents.aspx>

⁴ <https://www.tva.com/about-tva/our-history/tva-heritage/the-great-compromise>

5. LG&E/KU Access is Cost-Based
 - KYMEA cannot purchase power at market-based rates from LG&E/KU. LG&E/KU has horizontal market power within the LG&E/KU transmission system. KYMEA can purchase cost-based power from LG&E/KU. The reason the Kentucky Municipals left LG&E/KU as their power supplier and formed KYMEA was due to the increasing cost of the LG&E/KU cost-based power.
6. Non-RTO investor-owned utilities within Kentucky
 - Synapse states KYMEA could purchase power from non-RTO investor-owned utilities within Kentucky. KYMEA is confused by this assertion since LG&E/KU is the only investor-owned utility in Kentucky in the LG&E/KU control area. Duke Energy and AEP are in PJM. The cooperatives of Big Rivers and East Kentucky are in MISO and PJM, respectively. And the federally owned corporate agency, TVA, has its own balancing authority.

MISO Capacity Market

Facts

MISO holds a voluntary annual capacity auction called a Planning Resource Auction (PRA). The PRA provides a way for MISO Market Participants to meet resource adequacy requirements. The PRA's location-specific approach encourages resources to take part in the zones where they provide the most benefit.

KYMEA is not located in MISO. Synapse has suggested that KYMEA should be able to purchase capacity at a MISO PRA clearing price of \$3/MW-Day or \$0.09/kW-MO⁵. This sounds great but unfortunately is unrealistic. This suggestion indicates a fundamental misunderstanding of what the PRA represents.

Here is how the PRA works. Resource owners offer their generation and demand-side resources into the auction. Electric providers must secure enough resources to meet their Planning Reserve Margin Requirement (PRMR) either through self-supply, bilateral contracts, or through auction purchases. For providers participating in the auction, MISO will clear resources from within each local resource zone based upon economic merit, until the zone's Local Clearing Requirement (LCR) has been reached. After the zone's LCR has been reached, MISO will continue to clear resources from both within and outside of the local zone based upon economic merit, until the zone's PRMR is reached. The auction clearing price is the price of the most expensive resource that clears in the auction. In the event that there are insufficient resources to meet the zone's LCR or the zone's PRMR, the auction clearing price will be the Cost of New Entry (CONE), which is the cost of a new natural-gas-fired combustion turbine facility in the zone. For PY20/21, the CONE for MISO Zone 6 (Indiana/Kentucky) was \$240.49/MW-Day or \$7.31/kW-MO.

⁵ Synapse Comments Regarding KYMEA's IRP, page 9

2019/2020 PRA Results

As shown in the graph below, 16 market participants in the MISO Zone 6 auction offered 16,359.9 MW. 15,578.1 MW (95.2%) of the generation was offered at a penny or less. The reason 95.2% of the offer curve is offered at a penny or less is because the vast majority of the market participants (Duke, IPL, NIPSCO, Vectren, Big Rivers) have load in Zone 6 and simply want their generation to clear in the auction. The PRA structure is that generators sell all of their capacity into the auction and load buys all of its capacity from the auction.

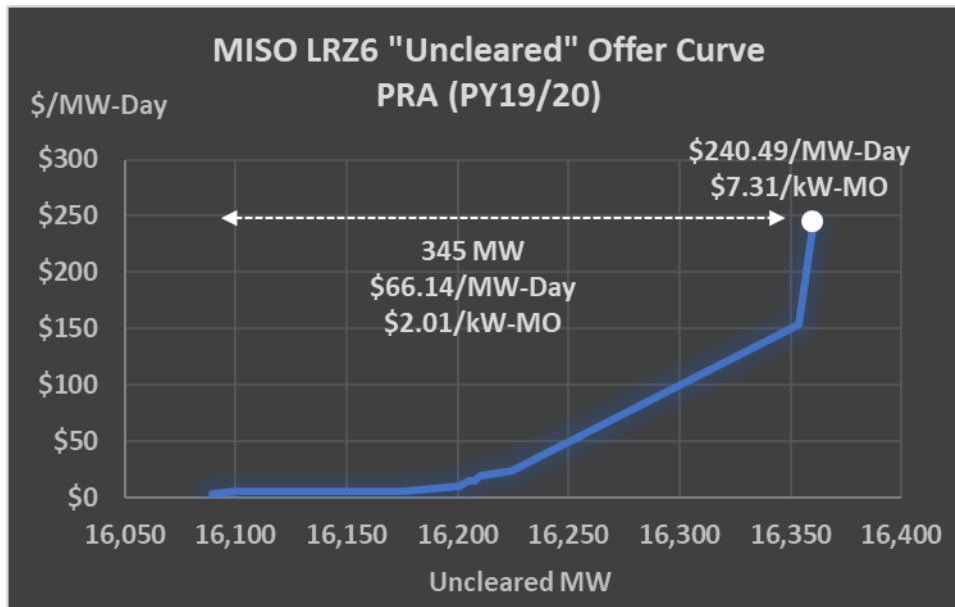
Chart 1 – MISO LRZ6 Offer Curve PRA (PY19/20)



The MISO Zone 6 market participants are primarily vertically integrated utilities regulated by their state utility commission. As such, there is no benefit to offer capacity into the PRA other than at a penny or less since their capacity for load must be purchased from the auction.

In Zone 6, 345.4 MW did not clear in the auction. The offer curve of the uncleared MW, which averaged \$66.14/MW-Day or \$2.01/kW-MO is shown below. The last increment was offered at \$240.49/MW-Day or \$7.31/kW-MO, which is equal to the CONE price.

Chart 2 – MISO LRZ6 “Uncleared MW” from Offer Curve PRA (PY19/20)



It is essential to recognize that the tail of the offer curve contains non-traditional resources such as behind-the-meter (BTM) generation, demand resources, and energy efficiency. These are MISO customer-specific resources that can be offered into the auction. For example, a DR resource may be a large industrial customer who is able to curtail a portion of its load in response to a MISO directive. These types of resources would not be available to KYMEA in a bilateral market transaction.

- In the PY19/20 PRA for all 10 Zones in MISO, 609 MWs that did not clear in the auction were either BTM generation, demand resources, or energy efficiency.

In a telling understatement, Synapse acknowledges that it “can be challenging for a non-member to acquire capacity at the market price.”⁶ Yet its recommendations are premised on the availability of capacity at the MISO PRA auction clearing price.

Synapse states that capacity in the MISO PRA has cleared at a very low price, which is true for the MISO members who have load in MISO. KYMEA does not have load in MISO.

- Notable exceptions to the Synapse very low capacity price statement is Zone 7 (Michigan) which in PY19/20 cleared at \$24.30/MW-Day and in PY20/21 cleared at \$257.53/MW-Day (\$7.83/kW-MO), and Zone 4 (Illinois), which in PY14/15 cleared at \$16.75/MW-Day and in PY15/16 cleared at \$150/MW-Day (\$4.56/kW-MO).

⁶ Synapse Comments Regarding KYMEA’s IRP, page 6

- The potential price volatility of the MISO PRA is very concerning. NIPSCO⁷ (Zone 6) has announced it is retiring 2,094 MW of coal. Vistra⁸ (Zone 4) has announced it is retiring 3,255 MW of coal. Alliant⁹ (Zone 3) is closing the 619 MW Duane Arnold nuclear plant this year. Combined, this is 5,968 MW that will be taken out of the auction in the next few years.
- Synapse states there is approximately 3,000 MW of low-cost capacity available¹⁰. But as KYMEA points out in the previous bullet, nearly 6,000 MW has been announced to be retired.

KYMEA, along with the MISO Independent Market Monitor, strongly disagrees that the past PRA price provides a market signal for the bilateral market from which KYMEA can purchase.

- KYMEA has conducted a request for indicative proposals for capacity only (no energy) and has found the bilateral market to be in the range of \$123.29/MW-Day.

Synapse's assertion that KYMEA can purchase capacity for \$3/MW-Day and have appropriate energy pricing indicates a lack of understanding of the market from which KYMEA can purchase capacity. Suggesting price benchmarks or alternatives that are unattainable invites public misunderstanding and unrealistic expectations.

MISO Independent Market Monitor Evaluation

The MISO Independent Market Monitor (IMM), Potomac Economics, is tasked with evaluating the MISO capacity market design.¹¹ In a recent report, Potomac states, **"The demand for capacity in the PRA continues to poorly reflect the true reliability value of capacity and undermines the market's ability to provide efficient economic signals."**

Potomac calculated if MISO moved to a sloped-demand-curve method, which is the same method used by PJM, then the Zone 6 market clearing price would have been \$148/MW-Day (\$4.50/kW-MO). Potomac recommends that MISO move to a sloped-demand-curve method along with other recommended improvements to the PRA. Synapse's contention MISO PRA prices will stay at \$3/MW-Day ignores the future impact of MISO's IMM recommendations.

⁷ <https://www.chicagotribune.com/suburbs/post-tribune/ct-ptb-nipsco-coal-energy-st-0927-story.html>

⁸ <https://www.forbes.com/sites/scottcarpenter/2020/09/30/power-company-will-shut-all-of-its-illinois-and-ohio-coal-plants-by-2027/#594d9ae5f3cd>

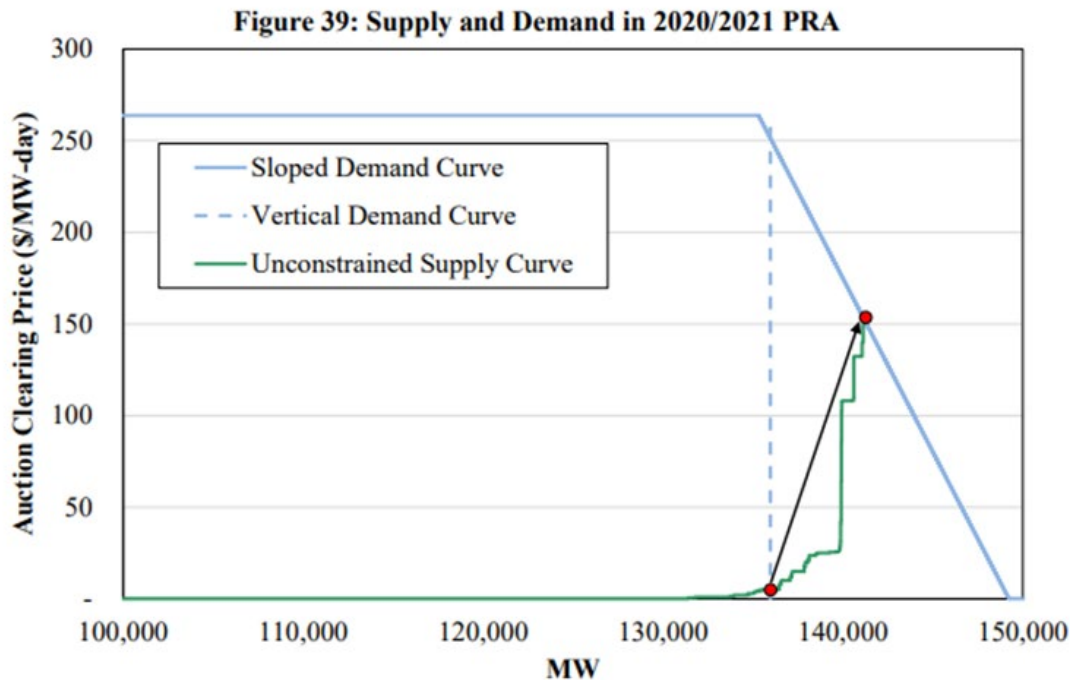
⁹ <https://www.powermag.com/duane-arnold-nuclear-plant-will-close-in-2020/>

¹⁰ Synapse Comments Regarding KYMEA's IRP, page 6

¹¹ <https://cdn.misoenergy.org/2019%20State%20of%20the%20Market%20Report453426.pdf> | 2019 State of the Market Report, page 91

Report Excerpt: MISO IMM Sloped-Demand-Curve Recommendation

In the 2020/2021 MISO PRA, Zones 1 through 6 and 8 through 10 cleared at clearing prices between \$4.75 per MW-day and \$6.88 per MW-day. These prices are close to zero, reflecting less than 3 percent of the CONE for investing in a combustion turbine in the Midwest. Zone 7 was short of the local clearing requirement and cleared at the \$257.53 per MW-day price cap set at the CONE in that region. Almost 136 GW of capacity cleared in the 2020/2021 auction.³⁹



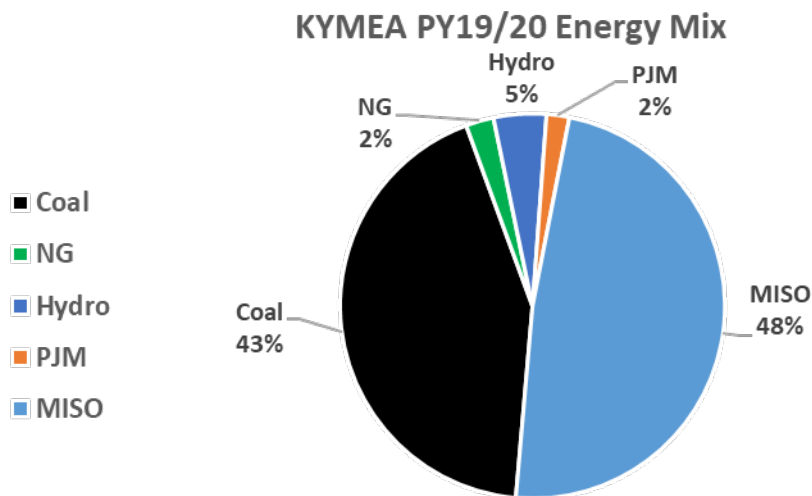
In our sloped-demand-curve simulation, we found that more than 141 GW of capacity cleared, while 431 MW of offered capacity would not have cleared. Auction clearing prices by zone would have been:

- \$148 per MW-day in Zones 1 through 6, 8, and 10, and for all external zones;
- \$155 per MW-day in Zone 9; and
- \$270 per MW-day in Zone 7, which is 5 percent higher than CONE.

KYMEA PY19/20 Energy Mix

Synapse states that KYMEA is currently over-reliant on coal. This statement does not reflect the reality of KYMEA's PPAs. While it is true the dispatch prices under KYMEA's coal PPAs are based on coal fuel costs, the PPAs provide complete flexibility for the agency to purchase energy from the market, if the market is cheaper. The PPAs can be thought of as heat rate call options, where the strike price of the options is tied to low-cost and stable coal-based energy. In PY19/20, KYMEA purchased 50% of its native load energy from the MISO and PJM markets, as illustrated by the pie chart.

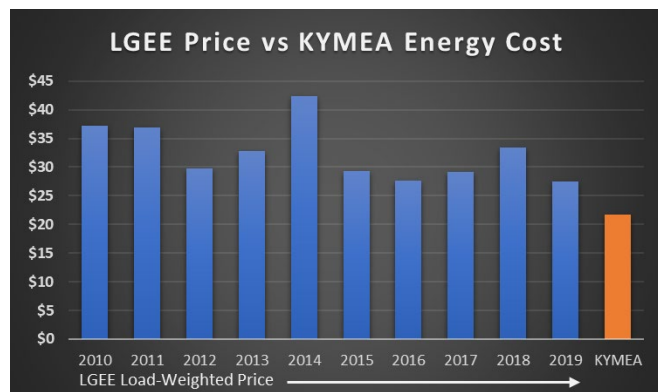
Chart 3 – KYMEA PY19/20 Energy Mix



KYMEA's energy cost was \$21.64/MWh, which is 20.3% lower than the load-weighted 2019 average LGEE price of \$27.14/MWh¹² referenced by Synapse.

As illustrated by the chart to the right, KYMEA's energy cost in \$/MWh (PY19/20) is lower than the LGEE interface price for each of the previous 10 years.

Important: For every dollar per MWh increase in energy cost, KYMEA has \$1.3 million in added expense. The KYMEA PPAs cap our exposure to high market prices while allowing KYMEA to take advantage of low market price opportunities when they present themselves.



¹² Synapse Comments Regarding KYMEA's IRP, page 9

KYMEA's Competitive and Risk Managed Portfolio

Synapse's statement that KYMEA holds several overpriced contracts and is overly reliant on coal is unsupported¹³. And its claim that KYMEA should be able to acquire future resources at costs approximating those as if KYMEA were able to purchase from MISO at current prices ignores the sensitivity of MISO energy and capacity prices. To demonstrate the riskiness of the Synapse recommendation, let us assume the entire KYMEA LG&E/KU load were able to be served by MISO (pseudo-tied).

As illustrated in Table 1, it is true that spot market prices in MISO, largely driven by the impact of the coronavirus pandemic on loads, were very low in PY19/20. If KYMEA had been able to purchase all of its power from the MISO market, it would have saved \$11.2 million.

Table 1 – KYMEA Actual vs MISO Market Power Cost

	Total	Energy	Capacity	PtP Trans	RTO Fees
KYMEA Actual	\$58,135,511	\$26,317,352	\$31,818,158	\$0	\$0
	4.780¢	\$21.64/MWh	\$9.21/kW-MO	\$0.00/MWh	\$0.00/MWh
Market Actual	\$46,922,104	\$30,410,162	\$488,104	\$15,713,681	\$310,157
	3.782¢	\$24.51/MWh	\$0.14/kW-MO	\$12.67/MWh	\$0.25/MWh

Market Price Risk

Now, let us consider two changes in the market price assumptions. Instead of using the LGEE market price of \$24.51/MWh, we will use the previous year's price of \$32.12/MWh. And for the capacity market, we will use the Potomac Economics sloped-demand-curve recommendation of \$4.50/kW-MO. In this very possible case, the cost would have been \$13.1 million higher.

Table 2 – KYMEA Actual vs Market Risk Case Power Cost

	Total	Energy	Capacity	PtP Trans	RTO Fees
KYMEA Actual	\$58,135,511	\$26,317,352	\$31,818,158	\$0	\$0
	4.780¢	\$21.64/MWh	\$9.21/kW-MO	\$0.00/MWh	\$0.00/MWh
Market Risk Case	\$71,289,041	\$39,848,933	\$15,416,270	\$15,713,681	\$310,157
	5.746¢	\$32.12/MWh	\$4.48/kW-MO	\$12.67/MWh	\$0.25/MWh

As illustrated in Tables 1 and 2, the market energy and capacity price can be extremely volatile, swinging costs between (\$11.2 million) and \$13.1 million. Given KYMEA's entire production cost expense was \$58.1 million, swings of +/- \$13 million are unacceptable. Further, in the polar vortex year of 2014, the market energy price was \$41.39/MWh. In that scenario, KYMEA's production cost would have exploded to \$82.8 million (41.2% higher).

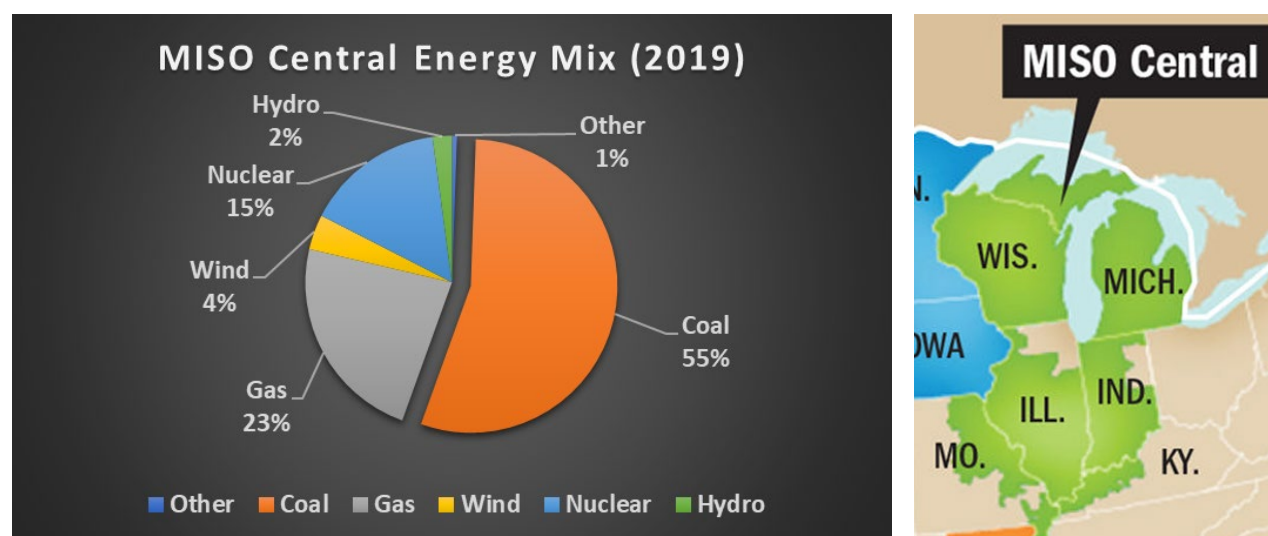
¹³ Synapse Comments Regarding KYMEA's IRP, page 10

The Synapse recommendation of purchasing LGEE spot energy with an assumed extremely low capacity price is far too risky, promoting unrealistic expectations at enormous risk. KYMEA's portfolio protects the agency from energy and capacity risks while still providing significant savings. If Synapse can guarantee the low prices of PY19/20 will continue, then an unhedged market position would be terrific. Of course, no reasonable agency practicing prudent risk management would operate in such a risky manner.

MISO Energy Mix

It is also confusing that Synapse states KYMEA is over reliant on coal while at the same time recommending KYMEA purchase from MISO. As shown in the chart below, MISO Central (Indiana, Kentucky, Illinois, Missouri, Wisconsin, and Michigan) is 55% coal. As shown earlier in Chart 3, KYMEA's coal mix in PY19/20 was 43%.

Chart 4 – MISO Central 2019 Energy Mix¹⁴



Conclusion

KYMEA's contracts are not overpriced and are in fact very competitive and stable. While the agency recognizes there is inherent risk in the energy industry, public power customers expect, and in fact demand, low and stable rates. That is the agency's mission. Leaving KYMEA members vulnerable to wild market swings is inconsistent with that mission. KYMEA is adding 54 MW solar in 2022 which diversifies our portfolio even further. The added solar, as a percentage of our load, places KYMEA as the leading solar producer in Kentucky.

¹⁴ [https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ASummary%2FMarketReportName%3AHistorical%20Generation%20Fuel%20Mix%20\(xlsx\)&t=10&p=0&s=MarketReportPublished&sd=desc](https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=%2FMarketReportType%3ASummary%2FMarketReportName%3AHistorical%20Generation%20Fuel%20Mix%20(xlsx)&t=10&p=0&s=MarketReportPublished&sd=desc)