TO: Chairman Brien J. Sheahan
CC: Executive Director, Cholly Smith
FROM: ICC Staff
Date: 11/1/2017

RE: RESOURCE ADEQUACY IN MISO ZONE 4

I. Resource Adequacy in MISO Zone 4

The content of this report is intended to inform the reader about long-term electric resource adequacy in the Ameren Illinois zone, otherwise known as MISO Zone 4.[1]

II. The Midcontinent Independent System Operator

In December 1997, the Illinois General Assembly enacted the Electric Service Customer Choice and Rate Relief Law of 1997, which significantly restructured the Illinois electric industry and provided a transition to competitive retail markets. The law also required that the public utilities in Illinois become members of a regional transmission organization ("RTO") approved by the Federal Energy Regulatory Commission ("FERC"). MISO has been approved as an RTO by FERC and Ameren Illinois is a member of MISO.[2]

Established in 1998, MISO is a non-profit RTO that manages the electricity transmission system over 15 states and the province of Manitoba, Canada. As a RTO, the FERC has charged MISO with the performance of numerous functions, including transmission planning, reliability coordination and the operation of wholesale energy markets.

A. Operation of Wholesale Markets

MISO operates a centralized wholesale electricity market where market participants are able to buy and sell various energy products such as capacity, energy and numerous ancillary services.[3] MISO does not own the power plants that generate the energy and capacity bought and sold in the market or the transmission facilities that move that power from the generators to the distribution utilities. However, MISO is responsible for developing the rules used to administer the energy, ancillary services and capacity markets, deciding which generators will run and at what levels, overseeing access to the transmission system and running the billing systems for

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[1] In addition to the Ameren Illinois Company, City Water Light and Power and Southern Illinois Power Coop serve as Balancing Authorities with Zone 4. Transmission-owning companies within Zone 4 include Ameren Illinois Company, City Water Light and Power, Southern Illinois Power Coop, and Prairie Power.

[2] *Alliance Companies, et al.*, 100 FERC ¶ 61,137 (2002) (July 31, 2002 Order), *order on clarification* (February 26, 2003 Order), 102 FERC ¶ 61,214, *order on reh'g and clarification*, 103 FERC ¶ 61,274, *order denying reh'g and granting clarification*, 105 FERC ¶ 61,215 (2003), *appeal docketed sub nom., American Electric Power Service Corp. v. FERC*, No. 03-1223 (D.C. Cir. Aug. 1, 2003).

[3] When a power plant is committed to provide capacity, it is making a commitment to be fully available for energy production when called on. Ancillary services help balance the transmission systemas it moves electricity from generating sources to distribution utilities.

payments. With over $25.3 billion in billings annually, MISO manages a very large transmission network and operates one of the largest energy markets in the world.

B. Transmission Planning and Generator Interconnection

At a high level, transmission planning involves identifying electric grid needs and then developing solutions to meet those needs. Through its transmission planning process, MISO takes into account many different factors affecting the grid's current and future operation, including potential customer demand, existing, planned and retiring power plants, state and federal environmental and clean energy standards, grid reliability issues, and the costs of moving power across the grid. Based on these and other factors, transmission owners and grid planners like MISO determine whether they need to upgrade existing, and/or construct new transmission facilities.

As a FERC-jurisdictional public utility transmission provider, MISO is required to follow the transmission planning principles and obligations laid out by the FERC in its landmark "Order 1000".[4] Order 1000 intends to ensure an open, transparent and coordinated regional transmission planning process by requiring transmission planners like MISO to produce a regional transmission plan that takes into account factors such as system reliability, market efficiency and public policies. Order 1000 also requires all grid planners to coordinate their regional transmission plans with neighboring regions and to develop regional and interregional cost allocation formulas to pay for new transmission projects. MISO's annual Transmission Expansion Plan ("MTEP") identifies network transmission expansion issues and opportunities, develops alternatives for consideration, and evaluates those options to determine effective transmission solutions.

MISO also facilitates the interconnection of new generation resources to the transmission grid. This requires MISO to review the proposed project, its location and the technical requirements necessary to reliably connect the generator to the transmission grid. As of October 2017, there are twenty-eight generator interconnection projects totaling almost 4,400 MWs of capacity in MISO's queue for Zone 4. As noted in the table below, these are primarily wind (2,147 MWs) and solar (2,160 MWs) projects, but also include one natural gas-fired generator project (57 MWs).

MISO Zone 4 Generator Interconnection Queue October 2017			
Transmission Owner	**Output (MW)**	**In Service Date**	**Fuel Type**
Ameren Illinois	150	2017	Wind
Ameren Illinois	102	2017	Wind

[4] Transmission Planning and Cost Allocation by Transmission Owning and Operating Public Utilities, FERC Stats. & Regs. ¶ 31,323 (2011), order on reh'g, Order No. 1000-A, 139 FERC ¶ 61,132, order on reh'g, Order No. 1000-B, 141 FERC ¶ 61,044 (2012), aff'd sub nom. S.C. Pub. Serv. Auth. v. FERC, 762 F.3d 41 (D.C. Cir. 2014).

Ameren Illinois	144	2017	Wind
Ameren Illinois	57	2017	Gas
Ameren Illinois	100	2019	Wind
Ameren Illinois	202	2019	Wind
Ameren Illinois	169	2019	Solar
Ameren Illinois	99	2019	Solar
Ameren Illinois	99	2019	Solar
Ameren Illinois	149	2019	Solar
Ameren Illinois	150	2019	Solar
Ameren Illinois	140	2020	Solar
Ameren Illinois	110	2020	Solar
Ameren Illinois	304	2020	Wind
Ameren Illinois	250	2020	Solar
Ameren Illinois	275	2020	Solar
Ameren Illinois	250	2020	Solar
Ameren Illinois	100	2020	Wind
Ameren Illinois	200	2020	Wind
Ameren Illinois	300	2020	Wind
Ameren Illinois	120	2020	Wind
Ameren Illinois	200	2020	Wind
Ameren Illinois	100	2020	Solar
Ameren Illinois	75	2020	Wind
Ameren Illinois	100	2020	Solar
Ameren Illinois	200	2020	Solar
City of Springfield, IL - CWLP	150	2019	Wind
Southern Illinois Power Cooperative	69	2019	Solar

C. Reliability Coordination and Resource Adequacy

As a reliability coordinator, MISO is responsible for the coordination of generation and transmission across its footprint, matching generation to load to balance supply and demand for electricity in real time. MISO forecasts load, schedules generation and coordinates generator maintenance and retirements to assure that sufficient generation and back-up power is available in case demand rises or a power plant or a transmission facility is lost.

The North American Electric Reliability Corporation requires MISO to conduct an annual loss of load expectation analysis that provides a measure of the expected generation resources necessary to meet a forecasted peak load throughout the year.[5] This analysis results in a planning reserve margin percentage that measures the level of resource adequacy throughout the MISO region and represents the sum of the probabilities for loss of load for all days of the planning year being

[5] NERC Standard BAL-502-RFC-02

equal to one day in ten years with respect to supply capability. Since 2011, MISO's targeted planning reserve margin in excess of annual forecasted load ranged from 14.2% to 17.4%.[6]

The responsibility for achieving resource adequacy in MISO rests with load serving entities ("LSEs")[7], with oversight by states, as applicable by jurisdiction. MISO provides LSEs with three options to meet their resource adequacy capacity obligation.[8] First, an LSE can demonstrate achievement of its assigned planning reserve margin requirement through submission of a fixed resource adequacy plan ("FRAP"). These plans may include such resources as owned generators and bilateral purchase contracts with generating companies either inside or outside of the LSE's local resource zone. Second, LSEs can use the "self-supply" option, where the LSE offers into MISO's annual Planning Resource Auction ("PRA") supply resources that are owned by, or committed to, the LSE. In MISO, these first two options are most commonly used by LSEs that are traditionally regulated and are able to build and own generating units or do so jointly with other utilities. Such LSEs with relatively stable load can limit their exposure to fluctuations in fuel prices, construction costs, regulatory requirements and other economic factors by entering into long-term purchase arrangements with independent facility developers or utilities with excess generating capacity. However, in restructured retail markets, the load of alternative retail electric suppliers and the basic service provider utility is subject to fluctuation due to customer switching, often making long-term contracts and the construction of generating resources impractical. Accordingly, such LSEs are more likely to use MISO's third option for demonstrating resource adequacy compliance, namely, procuring capacity through MISO's annual PRA.

Participation in MISO's PRA is voluntary for LSEs and the annual auction is typically held during the final three business days of March. LSEs use the auction to acquire capacity for the immediate planning year, which is the twelve-month period from June 1 to May 31. Generators use the PRA to sell capacity commitments on generation capability for which they do not have forward sales contracts. The auction is designed to optimize regionally and locally to establish the lowest-cost result for LSEs needing to procure capacity commitments.[9] The designation of local resource zones ("LRZs") helps to ensure a locational pricing of capacity that reflects limitation on the transmission system to deliver electricity in a particular area and to account for the different needs for capacity in various areas of MISO. For each LRZ, MISO specifies a capacity import limit and a capacity export limit designed to ensure reliability and recognize any transmission constraints. MISO also determines a planning reserve margin requirement and a local clearing requirement for each LRZ. The planning reserve margin requirement ("PRMR") is the total amount of capacity that each LRZ must procure and the local clearing requirement ("LCR") is a percentage of that amount of capacity that is required to be procured either from resources located within each LRZ or from resources external to the LRZ meet the established

[6] MTEP 17, Figure 6.1-1, https://www.misoenergy.org/Library/Repository/Study/MTEP/MTEP17/MTEP17%20Book%202%20Resource%20Adequacy.pdf

[7] The term Load Serving Entity encompasses traditional utilities (whether investor-owned municipal or coop), distribution utilities acting in their basic service provider role, and Alternative Retail Electric Suppliers.

[8] Eligible capacity resources include generators, generation purchase contracts, demand resources and energy efficiency.

[9] The MISO PRA uses a single clearing price auction design.

reliability equivalence standards. The following table shows the MISO Zone 4 parameters for the past four MISO PRAs.

Zone 4 Planning Resource Summary

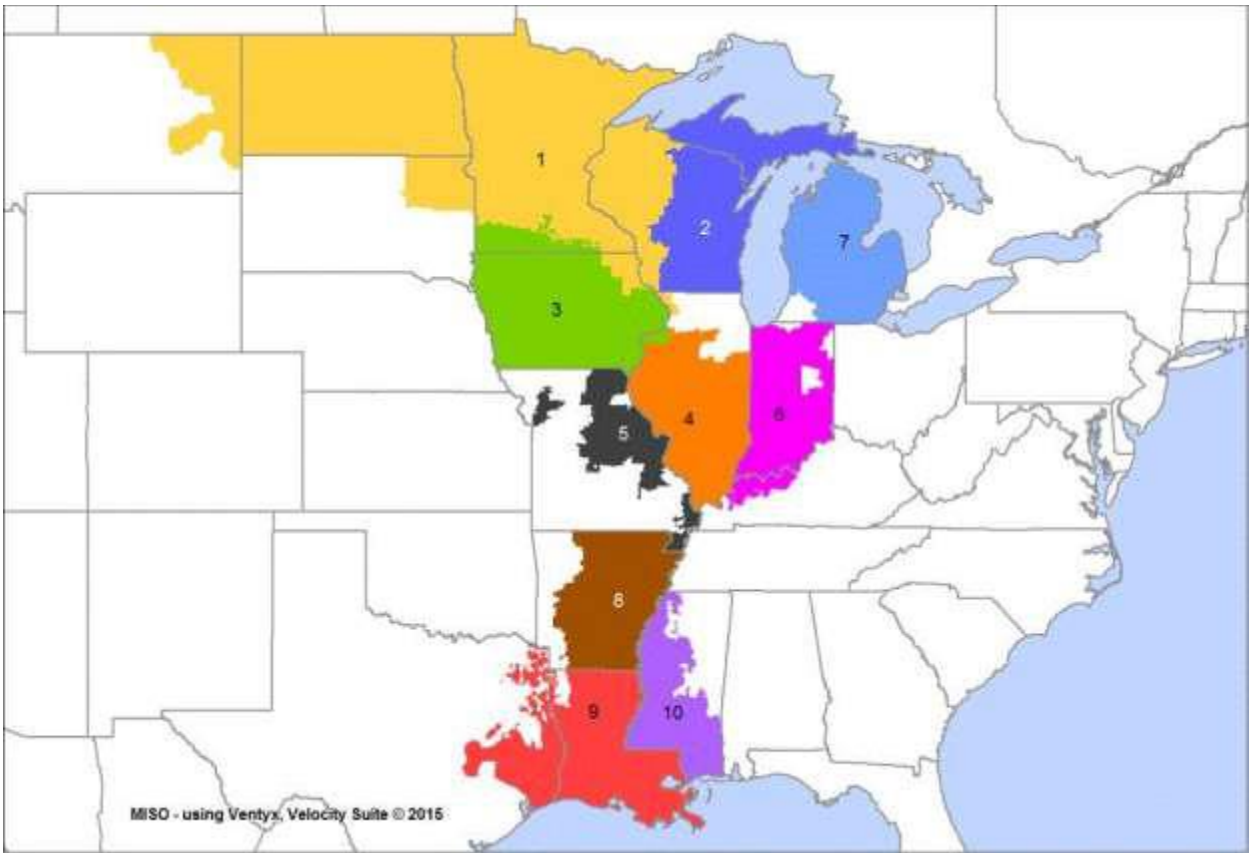
Planning Year	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018
PRMR (MWs)	10,616	10,420	10,375	9,894
LCR (MWs)	8,879	8,852	5,476	5,839
Capacity Import Limit (MWs)	3,025	3,130	6,323	5,815
Capacity Export Limit (MWs)	1,961	4,125	7,379	11,756
Total Committed (Offer Cleared + FRAP)	9,316	8,852	9,152	9,124
FRAP	874	838	910	712
Cleared Imports (MWs)	1,300	1,568	1,224	771
ACP $/MW-Day	$16.75	$150.00	$72.00	$1.50

For example, in the 2017-18 PRA, MISO determined that LSEs in Zone 4 needed to procure 9,894 MWs of capacity (PRMR), with at least 5,839 MWs coming from resources that are either located within the zone or from resources external to the zone that have firm transmission into the zone (LCR). The capacity import and export limits for Zone 4 were 5,815 MWs and 11,756 MWs, respectively. The results of the auction plus FRAP for that period show that Zone 4 was able to meet its planning reserve margin requirement by securing 9,124 MWs procured in the auction from resources located within the zone plus FRAP resources and imports of 771 MWs of lower-cost capacity from outside Zone 4. The auction clearing price ("ACP") reveals that all capacity supply obtaining capacity commitments in the PRA offered to sell at a price equal to or less than the ACP. The price paid for FRAP resources is unknown.

III. MISO Zone 4 Generating Capability and Energy Production

MISO's energy and capacity market region includes all, or a portion of, fifteen states. The map below shows the MISO region divided into ten LRZs, over which MISO coordinates the movement of wholesale electricity.[10] MISO Zone 4 includes the Ameren Illinois service area and MISO Zones 1 and 3 include relatively small areas of northwestern Illinois.

[10] MISO Tariff, Attachment VV, at 35.0.0



Currently, Zone 4 has 57 utility-scale generating stations, with a combined nameplate capacity of over 16,000 MWs and summer capacity of over 14,000 MWs.[11] These plants are owned and operated by a combination of municipals, merchants and cooperatives and employ diverse fuel types, including water, wind, natural gas, landfill gas, petroleum, nuclear and coal. Coal, natural gas and nuclear plants represent the bulk of electricity production capacity in MISO Zone 4. As shown in the table below, coal-fired plants produce the majority of electricity in Zone 4,

[11] Operating power plant operational status information is from the Energy Information Administration's Preliminary Monthly Electric Generator Inventory for May 2017 released July 31, 2017, found at https://www.eia.gov/electricity/data/eia860m/. Nameplate capacity information is from Form EIA-860 detailed data October 6, 2016 Final 2015 data found at https://www.eia.gov/electricity/data/eia860/. The information includes power plants in Illinois with one MW or greater of combined nameplate capacity operated by a utility or independent power producer and with MISO as the balancing authority. The information includes only plants identified by MISO as in MISO Zone 4 and excludes plants owned by commercial or industrial customers or with less than 1 MW of nameplate capacity. Although EIA lists EEI as its balancing authority, the Joppa Steam plant is included within this information because it is treated for the MISO PRA as located within Zone 4. EIA defines Summer Capacity as "the maximum output, commonly expressed in megawatts (MW), that generating equipment can supply to system load, as demonstrated by a multi-hour test, at the time of summer peak demand (period of June 1 through September 30.) This output reflects a reduction in capacity due to electricity use for station service or auxiliaries."

followed by the zone's sole nuclear plant (Clinton Generating Station). Notably, there is a significant amount of natural gas-fired capacity in Illinois. However, most of these plants were designed to operate during peak demand periods when electricity prices are high. A small portion of the natural gas-fired plants in MISO Zone 4 use combined-cycle technology, designed to produce "base load" generation or to operate economically even during off-peak periods.

MISO Zone 4 Power Plants[12]				
Primary Plant Technology	**2015 Summer Capacity (MWs)**	**2015 Summer Capacity (% of Total)**	**2015 Generation (MWhs)**	**2015 Generation (% of Total)**
Nuclear	1,065	7.5	8,663,837	15.2
Coal	8,051	57.0	45,026,215	78.8
Natural Gas	3,915	27.7	890,745	1.6
Petro	252	1.8	2,390	0.0
Wind	780	5.5	2,511,016	4.4
Hydro	38	0.3	48,487	0.1
Landfill Gas	16	0.1	19,440	0.0
Total	14,117	100.0	57,162,130	100.0%

Dynegy has complete and/or partial ownership of seven power plants in Zone 4 and the Joppa Steam Plant. The Joppa plant, located in southern Illinois, is outside of Zone 4, but for purposes of the MISO PRA, treated by MISO as if it were located in Zone 4. These plants have a combined capacity of approximately 6,500 MWs, making Dynegy[13] the largest producer of electricity in Zone 4. These plants have been responsible for nearly 50 percent of electricity production in MISO Zone 4.

Dynegy has stated that one third of its Illinois coal plants are at "high risk of retirement" and that another third is "under serious consideration for retirement". In the past several years, Dynegy has made several announcements concerning the potential retirement of portions of the Baldwin and Newton generating stations. The largest actual reductions of capacity in MISO Zone 4 in recent years can be attributed to the retirement of Dynegy coal-fired plants. In 2016, Dynegy

[12] The source for plant information is Form EIA-860 detailed data October 6, 2016 Final 2015 data. The source for 2015 and 2016 net generation data is Form EIA-923 detailed data October 12, 2016 Final 2015 data and August 2017 Early Release 2016. Information on which plants are operating is from EIA's Inventory of Operating Generators as of May 2017. The information includes only plants identified by MISO as in MISO Zone 4 and excludes plants owned by commercial or industrial customers or with less than 1 MW of nameplate capacity. Plants relying on multiple technologies are assigned according to their primary technology. Although EIA lists EEI as its balancing authority, the Joppa Steam plant is included within this information because it is treated for the MISO PRA as located within Zone 4. Both units of the Clinton LFGTE Landfill Gas facility are listed by EIA as "(OA) Out of service but expected to return to service in next calendar year." The Livingston Generating Facility and Unit 3 of the Baldwin Energy Complex are listed by EIA as "(OS) Out of service and NOT expected to return to service in next calendar year." Breese, Bushnell, Carlye, Freeburg, McLeansboro, Units 7 and 8 of Rantoul, Units 1-6, 9-12 of Sullivan, Units 1-8, 12-13 of Waterloo, Altamont, Energy Shelby County, City of Casey, and IMEA Highland are listed as "(SB) Standby/Backup: available for service but not normally used." The combined nameplate and summer capacity for all of these units, except the Clinton LFGTE units, are 1304 MW and 1136 MW, respectively. The information for these plants is included in the figures above.

[13] The Coffeen, Duck Creek, Edwards, and Newton plants are owned by the Dynegy company Illinois Power Holdings, LLC. The Joppa Steam Plant is co-owned by Dynegy and Electric Energy, Inc.

retired its 500 MW, coal-fired Wood River power station in Alton, Illinois and its 617 MW, coal-fired Unit 2 of the Newton power plant in Newton, Illinois. In 2015, Dynegy retired the 136 MW, coal-fired Unit 1 of the Edwards plant in Bartonville, Illinois. These past and potential future generator retirements are likely a significant contributor to MISO's expressed resource adequacy concerns.

Dynegy Plants in MISO Zone 4[14]						
Plant Name		**Nameplate Capacity (MWs)**		**Units (MWs)**		**In-Service Dates**
Baldwin		1,895		625		1970
				635		1973
				635		1975
Coffeen		1,006		389		1965
				617		1972
Duck Creek		441		441		1976
Edwards		645		281		1968
				364		1972
Havana		488		488		1978
Hennepin		306		75		1953
				231		1959
Newton		617		617		1982
Joppa		1,100		183		1953
				183		1953
				183		1954
				183		1954
				183		1955
				183		1955

IV. The OMS-MISO Survey

As part of efforts to ensure resource adequacy, MISO and the Organization of MISO States, ("OMS")[15] conduct a voluntary annual survey of MISO LSEs and independent power producers that attempts to assess and compare the amount of capacity expected to be available in MISO for five years forward to the regional and LRZ load forecasts. The intent of the survey is to provide MISO and regulators insight into the sufficiency of resources in the entire MISO footprint to meet MISO's planning reserve margin requirement, as well as how each LRZ in MISO will meet its share of the region-wide planning reserve margin. The survey also helps to give stakeholders and regulators an idea as to how well prepared the MISO region is for the future and if there are any areas of concern regarding resource adequacy.

[14] Energy Information Administration, Form EIA-860 Detailed Data (2016)

[15] The OMS is a regional state advisory committee that was established pursuant to FERC's direction in Docket No. RM01-12-000 to provide MISO with coordinated oversight that includes the views of the states throughout the MISO region. The OMS consists of 17 members, across 15 states and the Canadian province of Manitoba.

The OMS-MISO survey is not a rigorous or independent forecast prepared by a third party using thoroughly vetted data and information, but rather consists of several spreadsheets that are sent to each LSE and independent power producer in the MISO region. Survey participants provide MISO information about their existing and planned resources, as well as data regarding their load, imports/exports and inter-zonal transfers. While participation in the survey is voluntary, a high percentage of LSEs in the MISO footprint typically participate in the survey. For example, in 2017, the survey represented more than 95 percent of the total load in the MISO region.

The OMS-MISO survey first noted the potential for a deficit relative to its target reserve margin requirement in its 2015 survey, stating that the MISO regions could face a capacity deficit of 1.8 gigawatts ("GWs") as early as 2020.[16] In this instance, the projected capacity deficit was in the portions of MISO located in the upper-Midwest, lower Michigan, Indiana and Kentucky. The 2016 OMS-MISO survey noted that the amount of surplus capacity in the MISO region was declining due to the announced retirement of certain capacity resources.[17] LRZs with potential out-year capacity deficits included Michigan, Missouri and Illinois. MISO estimated that the planning reserve margin requirement deficit in Zone 4 could be 1.2 GWs for 2017 and almost 1.7 GWs by the 2021 delivery year. While MISO does not provide stakeholders or regulators with the data submitted by survey participants, a large portion of the then-projected deficit in Zone 4 can likely be attributed to Exelon's announcement that it intended to retire the Clinton nuclear power plant.[18]

In the 2017 survey, MISO projected a surplus for the 2018 delivery year of 2.7 to 4.8 GW in excess of the reserve margin requirement due to changes in resource commitments and decreased demand.[19] For the 2018 delivery year, Zone 4 went from an estimated 1.6 GW deficit in the 2016 survey to an estimated 0.7 to 1.6 GW surplus. The 2017 survey also forecasts a surplus of 0.4 to 1.5 GWs for Zone 4 for the 2022 delivery year. This surplus in the Zone 4 can likely be attributed, in part, to Exelon's decision to rescind its retirement announcement for the Clinton nuclear power plant operating in Zone 4. The reserve margin across the MISO region is expected to range from 16 to 22 percent in the 2018-2022 timeframe. This is above the target planning reserve margin requirement of 15.8 percent.

The use of the OMS-MISO survey to measure resource adequacy has received mixed reactions. Some critics argue that the survey is not a rigorous, independent examination of resources in MISO and that the survey is also unable to capture the entry and exit decisions of merchant generators that can occur within the five-year forward period of the survey. Others argue that the survey results are unreliable in that the survey is overly-sensitive to MISO's load forecast, which is the basis of the planning reserve margin and the OMS-MISO survey. Conversely, some MISO stakeholders have argued that the OMS-MISO survey is overly-conservative and focused on the

[16] https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/SAWG/2015/20150709/20150709%20SAWG%20Item%2002%202015%20OMS-MISO%20Survey%20Results.pdf

[17] https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2016/20160629/20160629%20RASC%20Item%2003%20OMS-MISO%20Survey%20Full%20Deck.pdf

[18] http://www.exeloncorp.com/newsroom/clinton-and-quad-cities-retirement. MISO treats individual responses to its survey as confidential. As a result, which particular resources MISO includes or excludes when reporting results of the survey are not publicly available.

[19] https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2017/20170712/20170712%20RASC%20Item%2002%20OMS%20Survey%20Results.pdf

low-end of capacity estimates, resulting in unnecessarily alarming results and exaggerating any possible capacity deficits. In particular, state regulators in traditionally regulated states and the utilities that they regulate argue that their use of integrated resource planning helps assure long-term resource adequacy, even if the particular resources expected to be used in the forward period are unknown at the time of the survey. While MISO has taken some steps to address these criticisms, the result is that the OMS-MISO survey is limited in its ability to provide clear and reliable insight into resource adequacy in either the MISO region or its LRZs.

V. MISO's Competitive Retail Solution

In 2016, MISO initiated an examination of its PRA, which MISO referred to as its "Competitive Retail Solution" ("CRS"). MISO intended for the CRS to address their concerns regarding the ability of competitive retail areas of the MISO region in Michigan and Illinois to ensure enough electricity capacity resources to meet demand on a long-term basis. The CRS was prompted, in part, by the results of the 2016 OMS-MISO surveys forecasting potential capacity deficits in the competitive retail areas of MISO.[20]

MISO's main concerns with resource adequacy in the competitive retail areas was that there is no state regulatory agency charged with ensuring resource adequacy and that the MISO PRA may not adequately address the resource adequacy needs of competitive retail areas.[21] MISO also expressed a concern with tightening reserve margins across the MISO footprint that could hinder the ability of LSEs in competitive retail areas from addressing any capacity deficits through the import of excess capacity from other MISO zones.[22]

In an effort to address its concerns regarding the long-term resource adequacy in competitive retail areas, the MISO CRS proposed a partial forward-looking market for capacity for competitive retail areas by incorporating several features that were different from MISO's current PRA construct. MISO's belief was that a three-year forward resource auction ("FRA"), in contrast to the prompt-year PRA, would incent investment in capacity resources and provide greater assurance of long-term reliability for the MISO region. In competitive areas, the CRS would replace the PRA's administratively determined vertical demand curve with an administratively determined downward-sloping demand curve. The use of a vertical demand curve results in the procurement of the exact amount of capacity necessary to meet MISO's planning reserve margin, regardless of cost. The downward-sloping demand curve allows the amount of capacity purchased to fluctuate, depending on offer-price and supply conditions. Critics argue that a vertical demand curve can produce excessive year-to-year price volatility and results in severe price spikes when resource availability declines. The proposed downward-sloping demand curve was intended to mitigate this purported price volatility and provide resource owners and developers with a more predictable stream of revenue, which was suggested to encourage the retention of existing resources and investment in new resources. MISO

[20] MISO's Competitive Retail Solution – What it is, Why it's Needed, How it Works, (October, 2016) http://www.misomatters.org/2016/10/misos-competitive-retail-solution-what-it-is-why-its-needed-how-it-works
[21] MISO's Competitive Retail Solution – What it is, Why it's Needed, How it Works, (October, 2016) http://www.misomatters.org/2016/10/misos-competitive-retail-solution-what-it-is-why-its-needed-how-it-works
[22] MISO's Competitive Retail Solution – What it is, Why it's Needed, How it Works, (October, 2016) http://www.misomatters.org/2016/10/misos-competitive-retail-solution-what-it-is-why-its-needed-how-it-works

proposed these changes only with respect to competitive retail areas, which would have had the effect of bifurcating MISO's planning resource auction process.

Ultimately, the FERC rejected MISO's CRS proposal on multiple grounds.[23] The FERC's primary concern was that the bifurcated capacity market under the CRS would be less efficient and suffer from poor price formation, relative to a MISO-wide clearing process that operates within a single set of transmission capability constraints and supply offers. The FERC also expressed concerns with the relatively small amount of demand in competitive retail areas and potential for increased volatility in the PRA due to a vertical demand curve in the PRA and a downward-sloping demand curve in the CRS. Ultimately, the FERC was not convinced that the CRS would produce efficient pricing outcomes, as supply sources outside of MISO would be able to choose between a three-year forward auction and a prompt auction.

VI. Resource Adequacy, Transmission Import Capability and MISO's MVPs

Transmission import capability plays a key role in ensuring resource adequacy in the MISO region and in its LRZs by allowing LSEs to access low-cost generation resources from both other areas within MISO and from regions external to MISO to minimize the cost of capacity and energy for consumers. Absent sufficient transmission import capability, LSEs within an LRZ may be forced to rely more extensively on generation resources located inside the LSE's zone to meet the planning reserve margin requirement even when lower cost generation resources are available outside the zone.

Prior to each PRA, MISO performs a series of transfer analyses to determine the ability of each local resource zone (including Zone 4) to reliably import and export power. Capacity import limits ("CIL") are found by modeling increases in MISO generation resources in adjacent zones while decreasing generation inside the zone under study until a limiting constraint is identified. For instance, during the 2017-18 PRA, Zone 4 had a CIL of 5,815 MWs, with the Ballard-Meredosia 138-kV transmission line being identified as the limiting contingency. The CIL for the 2018-19 PRA is tentatively 6,278 MWs, with the Clinton nuclear plant as the limiting contingency. Capacity export limits ("CEL") are determined by increasing the amount of generation within a particular zone, while proportionately decreasing the generation in all other MISO zones until a constraint is reached. For Zone 4, the CEL for the 2017-18 PRA was 11,756 MWs. The Zone 4 CEL for the 2018-19 PRA is tentatively set at 4,280 MWs. MISO also determines a local clearing requirement ("LCR") for each zone, which is the minimum number of MWs that must be located within each zone (or treated as if they were located in the zone) in satisfying the Zone's PRMR. Factors that contribute to a zone's LCR include the zone's CIL, CEL, local reliability requirement and any exports outside of MISO. The Zone 4 LCR for the 2017-18 PRA was 5,839 MWs. The LCR for the 2018-19 PRA is tentatively set at 7,265 MWs.

In the 2017-18 PRA, Zone 4 had a PRMR of 9,894 MWs, an LCR of 5,839 MWs and a CIL of 5,815 MWs. This means that Zone 4 had to source 5,839 MWs from inside the zone (or equivalent resources), leaving 4,079 MWs to be sourced from inside or outside of the zone. Given that the CIL for the zone was 5,815 MWs, there was more than enough transmission

[23] Midcontinent Independent System Operator, Inc., 158 FERC ¶ 61,128 (2017)

capacity to allow Zone 4 to meet the balance of its PRMR obligation by importing resources from outside of the zone. Such a scenario would require that there be sufficient capacity located outside the zone and that it is offered at a low-enough price to clear ahead of the remaining available generation inside Zone 4. In reality, the recent auction results for Zone 4 showed just 771 MWs of capacity imports.

In 2011, MISO's Board of Directors approved it first multi-value project ("MVP") portfolio that included 17 new high-voltage transmission projects intended to meet renewable energy mandates and goals by moving over 41 million MWh of wind energy annually from western MISO to markets. Every zone in the MISO North region has an MVP project, with five 345-kV transmission lines being located in Illinois. The construction of the Illinois portion of these MVP projects is well under way, with one line completed and the remainder expected to be finished by 2019. When completed, the MISO MVPs will increase the import capability for almost all transmission zones in MISO and, in particular, enable access to lower-cost surplus generation located outside of Zone 4.

VII. Business Environment for Generators in Zone 4

A. MISO's Capacity Market

Generators that operate under a traditional, vertically integrated construct obtain nearly all of their revenues through retail rate base and retail sales of electricity. Conversely, power plants in competitive retail markets derive the majority of their revenues through the sale of electricity, ancillary services and capacity in wholesale markets. The sale of electricity can take place through a variety of contractual forms - through "over-the-counter" markets, organized exchanges, RTO spot markets, bilateral contracts, auctions, etc. and are usually for a set duration of time. Ancillary services refer to a variety of generator attributes beyond the generation of electricity used by grid operators to maintain grid stability and security. In the MISO footprint, power plants can provide these services through a MISO-operated ancillary services market or rate-based regulated sales. When a power plant sells capacity, it is making a commitment to be fully available for energy production when called on during the commitment period. MISO has operated an annual planning resource auction for capacity since 2013.

While there are numerous factors in the current electric industry's business environment that contribute to generator business risk, merchant generators face an additional risk that traditionally regulated generators do not face. This additional risk stems from MISO's energy and capacity market auction design. MISO's PRA allows competing generators owned by traditional state-regulated utilities to offer their capacity into MISO's auction at prices that do not reflect the true marginal cost of that capacity. Because these utilities are compensated through traditional state-regulated rates, they typically use the self-supply option in MISO's PRA and offer their generation capacity at lower prices than a merchant power producer would. Generators operating as merchants are dependent on MISO's capacity, energy, and ancillary services markets to recover all of their operating costs and to support investment decisions. The relatively low capacity clearing prices in MISO that result from low offers submitted by traditionally regulated utilities present merchant generators with economic challenges. Some such merchant generators in Zone 4 have taken steps to switch their sales to the PJM capacity

market,[24] which generally pays a higher price for capacity than the MISO capacity market. When pursuit of such alternative revenue options fails, pressure increases for premature unit retirement.

B. Energy and Capacity Growth Rates

The electricity industry is currently facing a relatively static demand for electricity and there is an expectation that low load growth may persist in the future. The State Utility Forecasting Group at Purdue University conducts annual load forecasts for the MISO region and in 2016; the forecasted annual growth rate for Zone 4 for the time period of 2017-2026 was 0.64 percent.[25] When the study accounted for energy efficiency, demand response and distributed generation, the annual growth rate for Zone 4 fell to 0.45 percent.[26] The projected annual growth rates for MISO system-wide energy and peak demand were 1.25 percent for energy, 1.24 for summer peak demand and 1.25 for winter peak demand.[27] When the study accounted for energy efficiency, demand response and distributed generation, those same growth rates fell to 1.15 percent, 1.06 percent and 1.02 percent, respectively.[28] All generators in MISO compete against each other to serve new incremental load. As load growth for the near future is expected to remain relatively modest, this competitive pressure is not likely to go away.

C. Compliance with Environmental Standards

The profitability of merchant coal-fired plants are also subject to increased costs due to compliance with recent/potential environmental regulations. In recent years, the U.S. Environmental Protection Agency ("EPA") has issued numerous standards intended to reduce harmful air emissions. The Mercury and Air Toxics Standards require power plants to limit their emissions of pollutants such as mercury, arsenic and metals.[29] The Cross-State Air Pollution Rule requires fossil fuel-fired electric generating units at coal-, gas-, and oil-fired facilities in 27 states in the eastern half of the U.S. to reduce emissions to help affected downwind areas.[30] Illinois has also implemented legislation intended to address mercury emissions from power plants that are more stringent than federal requirements.[31]

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[24] This practice is known as "pseudo-tying".

[25] See Table ES-1, *2016 MISO Independent Load Forecast*, November 2016. https://www.misoenergy.org/Library/Repository/Study/Load%20Forecasting/2016%20Independent%20Load%20Forecast.pdf

[26] See Table ES-2, *2016 MISO Independent Load Forecast*, November 2016. https://www.misoenergy.org/Library/Repository/Study/Load%20Forecasting/2016%20Independent%20Load%20Forecast.pdf

[27] See Table ES-4, *2016 MISO Independent Load Forecast*, November 2016. https://www.misoenergy.org/Library/Repository/Study/Load%20Forecasting/2016%20Independent%20Load%20Forecast.pdf

[28] See Table ES-4, *2016 MISO Independent Load Forecast*, November 2016. https://www.misoenergy.org/Library/Repository/Study/Load%20Forecasting/2016%20Independent%20Load%20Forecast.pdf

[29] https://www.epa.gov/mats

[30] https://www.epa.gov/csapr/cross-state-air-pollution-rule-csapr-fact-sheets

[31] http://www.epa.illinois.gov/topics/forms/air-permits/mercury-rules/index

All told, compliance with environmental initiatives present additional costs for resources such as coal-fired plants. While environmental legislation typically results in increased prices for electricity and capacity, coal-fired plants may not benefit from these increases in price to the extent they also bear the cost of compliance. Conversely, renewable generators, which compete directly with the coal-fired plants, benefit from emissions-compliance driven increases in wholesale electricity prices.

D. Abundant, Low-Cost Natural Gas

An increasing percentage of new generation resources in many parts of the U.S. have been fueled by clean-burning, low-cost natural gas. This is largely due to an increasing supply of natural gas, lower forward-looking prices, an increased focus on carbon dioxide emissions from power plants and the relative flexibility of siting, construction and operation of natural gas powered generation. This regional trend also appears to be accelerating as an increasing amount of coal-powered generation is being retired due to age, environmental restrictions, or economic pressures.

While the dash-to-gas has not been as pronounced in Illinois as in some other portions of the country, as demonstrated by the Zone 4 generator interconnection queue data on page 8 above, energy and capacity prices throughout MISO and in Zone 4 have been affected by the general increase in natural gas generating capacity in recent years. Because of relatively low natural gas prices and improved technological efficiencies of new natural gas generation plants, these plants can successfully compete in regional wholesale markets. The result of these trends has generally been to flatten market supply curves, particularly in the increments that often set wholesale market clearing prices. The result is a lowering of revenue for the marginal unit as well as all of the infra-marginal suppliers, because RTO markets, including those operated by MISO, work on the single auction clearing price design.

E. The Future Energy Jobs Act

On December 7, 2016, Public Act 99-0906 (commonly referred to as the Future Energy Jobs Act or "FEJA") was enacted into law with an effective date of June 1, 2017. Among other things, the FEJA calls for updates to Illinois' renewable portfolio standards, revises energy efficiency standards and creates a new zero emission standard. The overall result of FEJA is to encourage development of more renewable resources, reduce the growth of electricity usage through increased energy efficiency and retain zero-emission nuclear facilities that may have otherwise ceased operation.

With respect to renewable energy, the FEJA retains the previous target of 25 percent of retail energy coming from renewable energy sources by 2025, but provides more funding for renewable resource generation deployment to achieve the target.[32] The FEJA establishes both interim and long-term renewable energy goals that are to be met through the Illinois Power Agency ("IPA") procuring a significant amount of utility-scale solar and wind renewable energy credits ("RECs") annually through 2030. Further, the FEJA creates an Adjustable Block Program to facilitate the procurement of RECs from new solar distributed generation and/or

[32] 20 ILCS 3855/1-75(c)(1)(B)

community renewable generation projects.[33] Finally, the FEJA creates a Solar for All Program that creates a special fund in the Illinois treasury administered by the IPA to purchase RECs according to an approved procurement plan and provides incentives for low-income distributed generation and community solar projects.[34]

With respect to energy efficiency, the FEJA requires Illinois utilities, by 2030, to achieve between 16 percent and 21.5 percent in cumulative persistent annual savings, relative to their average annual sales for the years 2014-2016. The FEJA also provides the utilities with performance-based financial incentives and penalties for meeting their efficiency targets. Finally, the FEJA creates specific carve-outs for efficiency spending on low-income programs and public buildings.

The FEJA requires the IPA to enter into ten-year contracts to procure zero emission credits ("ZECs") from nuclear power plants to cover 16 percent of electricity delivered by electric utilities in calendar year 2014.[35]

The FEJA stands to drive growth in renewable energy and energy efficiency resources by requiring the utilities to take long-term positions with respect to energy efficiency and renewable energy. The ZES portions of the FEJA will also allow financially vulnerable nuclear plants, which may include the Clinton Power Station in MISO Zone 4, to forestall retirement for the next decade. Nuclear power plants tend to be very reliable, have high capacity and high capacity factors. They therefore, are formidable competitors to all resources, including coal-fired plants.[36]

The renewable energy and energy efficiency requirements in the FEJA stand to significantly lower the amount of demand in Illinois and increase the amount of new renewable generation built in Illinois. The FEJA, when paired with the increase in available low-cost natural gas and nuclear energy resources, reduces the ability for generation capacity from older and relatively more expensive coal-fired plants to successfully compete for the sale of capacity and long-term energy contracts.

IX. Potential Policy Options

There are several possible responses the State of Illinois might make to the long-term resource adequacy concerns raised in MISO's letter to Governor Rauner, including:

1. Rely on existing competitive forces and market structures;
2. Impose additional capacity requirements on load serving entities;
3. Create a reliability portfolio standard;
4. Reconfigure RTO participation

[33] 20 ILCS 3855/1-75(c)(1)(K)
[34] 20 ILCS 3855/1-56(a),(b)(1)
[35] 20 ILCS 3855/1-75(d-5)(1)
[36] Copied from slide 4 of "Capacity Performance," a presentation posted for the Education and Dialogue Session, August 12, 2014, of PJM's Markets and Reliability Committee, which is posted on the PJM website: http://www.pjm.com/~/media/committees-groups/committees/mrc/20140812/20140812-item-01-capacity-performanceproblem-statement-presentation.ashx

1. Continue to rely on existing competitive forces and market structures

Section 101A of the Illinois Public Utilities Act states:

> Competitive forces are affecting the market for electricity as a result of recent federal regulatory and statutory changes and the activities of other states.
>
> A competitive wholesale and retail market must benefit all Illinois citizens. The Illinois Commerce Commission should act to promote the development of an effectively competitive electricity market that operates efficiently and is equitable to all consumers.

MISO was able to obtain capacity sufficient to meet the planning reserve margin requirement in its most recent MISO planning resource auction, for the June 1, 2017 – May 31, 2018 delivery year, and was able to do so at a clearing price of $1.50/MW-day or $548/MW-year. In that same delivery year, the Cost of New Entry for Zone 4, which represents the annualized capital cost of constructing a power plant was $94,690/MW-year.[37] Additionally, MISO's recent 2017 OMS MISO Survey Results suggest that Zone 4 capacity requirements will continue to be met through 2022. Planned transmission and generation provide additional reason for optimism in this regard.

It's notable that resource adequacy for much of the retail load in Zone 4 may already be adequately covered through self-supply, for example by the muni utilities and coop utilities serving retail load in Zone 4, or by Dynegy which is the dominant alternative retail electric supplier in Zone 4 as well as the dominant generator. As shown in the Table on page 5 above, FRAP load for Zone 4 has ranged between 712 and 910 in the most recent four delivery years. In conjunction with resource adequacy coverage for Ameren Illinois basic service load as described in Subsection 2.a below, the amount of Zone 4 retail load whose capacity needs are covered through MISO's PRA is limited and could be further reduced.

Since the state of Illinois adopted electric industry restructuring and Illinois generators were spun out of the utility (Ameren Illinois) to merchant companies, the ICC lost its Public Utilities Act authority to request and obtain data from Illinois generators. Reinstating the ICC's authority to obtain generator data would provide a mechanism to better assess whether resource adequacy is, or is becoming, a problem in Zone 4. Better information, available from year-to-year would enable more focused tailoring of solutions to developing issues and problems.

In addition, while MISO's proposed competitive retail solution failed to pass muster at FERC, many observers believed that proposal failed largely on the basis of its far-reaching impacts. On the other hand, there are numerous, more modest market-based modifications that could be made to MISO's current energy, ancillary services, and capacity constructs to better address resource adequacy needs by compensating beneficial generator attributes and valuable grid services that generators may provide. For example, PJM is currently studying energy and ancillary services market modifications falling under the rubric of "price formation".

[37] https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/RASC/2017/20170412/20170412%20RASC%20Item%2003d%20CONE%20Technology%202017-2018.pdf

While none of these past outcomes or projections fully assure Zone 4's long-term resource adequacy needs, Illinois could rely on them as a basis for taking no action or limited action, at this time. Illinois could continue to rely upon market structures and competitive forces to ensure that MISO Zone 4 will have access to low-cost, adequate supply resources going forward.

2. Impose additional capacity requirements on load serving entities

The bulk of electricity generated in MISO Zone 4 has been coal-fired generation. With past coal plant retirements and the potential for more retirements, the plants that have historically been the source of the majority of electricity generated in Zone 4 may not be available to Illinois in the future. Despite projections that new transmission and generation will be deployed, there is no guarantee that new generation will be built, be available for import, or otherwise materialize to replace these traditionally reliable generating resources. Illinois could take steps to reduce resource adequacy uncertainty by imposing additional capacity requirements, beyond those imposed by MISO, on load serving entities. For example, such steps could employ IPA hedging for basic service load or fixed resource adequacy planning applicable to both basic service load and load served by ARES.

a. Illinois Power Agency forward capacity hedging for basic service load

The IPA was established to develop procurement plans and conduct procurements of resources necessary to serve customers in classes that have not been declared competitive and who take service from the utility's bundled rate ("eligible retail customers"). Under the authority granted it by the General Assembly, and subject to ICC approval, the IPA conducts procurements of both energy and capacity for Ameren Illinois' bundled customers in MISO Zone 4.

Under its currently approved procurement plan, the IPA is following a hedging strategy for energy procurement. This approach uses a laddering technique whereby a portion of forecasted energy needs are purchased up to three years ahead of a delivery year. For example, in early 2017 the IPA sought to procure 12.5% of forecasted need for the June 1, 2019 – May 31, 2020 delivery year. The plan calls for the IPA to purchase additional incremental blocks of energy to meet 12.5 percent for of forecasted need for the June 1, 2019 – May 31, 2020 delivery year in each of the fall 2017, the spring 2018, and the fall 2019 procurement events. The remaining forecasted need is scheduled to be procured in the spring and fall of 2019 just prior to when the energy is to be delivered.

With respect to capacity, the IPA's currently approved procurement plan calls for procurement of 25 percent of forecasted need for the for the June 1, 2018 – May 31, 2019 delivery year in the fall of 2016 and another 50 percent of need in the fall of 2017. The remaining forecasted need is scheduled to be obtained through MISO's planning resource auction, conducted shortly before the beginning of the June 1, 2018 – May 31, 2019 delivery year.

By purchasing energy and capacity in advance of when these products are delivered, the procurement plans provide some assurance that adequate resources will be available in the future. Illinois could provide additional resource adequacy assurances in MISO Zone 4 by increasing the amount of forward energy and capacity that is procured for Ameren Illinois

customers. Advance purchases will provide generators a highly certain stream of known revenues that may better ensure their future availability. This approach could be pursued by the IPA with the approval of the ICC or it could be ordered by the ICC.

Relying on the current procurement process to better assure resource adequacy will, however, be of limited effectiveness. The load of eligible retail customers is only a fraction of overall load in Ameren Illinois' territory. The IPA is not authorized to procure any resources for Ameren Illinois' larger customers (those with demand in excess of 150 kilowatts) or for customers that use a supplier other than Ameren Illinois. For example, for the June 1, 2018 – May 31, 2019 delivery year, Ameren Illinois' eligible retail customer load is forecasted to be only 36% of the overall load in Ameren Illinois' service area.

Additionally, while the IPA has used hedging as a strategy primarily to mitigate against pricing variability, the strategy can be a costly one. For example, in the fall of 2016, the IPA procured capacity for the June 1, 2017 – May 31, 2018 delivery year at average rates of $143.20 per MW-day. Capacity in the MISO planning resource auction, for that same delivery period, subsequently cleared at a price of $1.50 per MW-day.

b. Forward Fixed Resource Adequacy Plan (FRAP) for basic service and ARES load.

i. ARES FRAP Reports

As an alternative to procuring capacity through MISO's planning resource auction, load-serving entities can submit a FRAP to MISO. Load serving entities may submit FRAPs to MISO that demonstrate capacity resources are deliverable to them to adequately satisfy their planning reserve margin requirement and other MISO imposed capacity requirements for a planning year. While the IPA and the ICC could, under existing authority, administer procurements to procure resources that would enable Ameren Illinois to submit a FRAP to MISO, the IPA and the ICC currently do not have the authority to require ARES to submit FRAPs. ARES could be required to submit FRAPS to MISO and to provide advance reports of such to the ICC.

ii. IPA FRAP Procurement

Alternatively, the IPA, with ICC oversight could procure capacity on behalf of Alternative Retail Electric Suppliers serving load in Ameren Illinois' service area. The General Assembly could, in order to address resource adequacy, provide the IPA and the ICC authority to administer capacity procurements on behalf of ARES as well as Ameren Illinois acting as the basic service provider. Such legislation could specify how capacity is to be procured, assign the design to the IPA and the ICC, or adopt some hybrid of the two approaches. This could include plans that specify a forward procurement period, allow for multi-year capacity purchases, capacity purchases that enhance supply diversity, or other factors that may increase long-term resource adequacy in MISO Zone 4.

3. Create a Resource Adequacy Portfolio Standard

MISO has expressed concerns, both in its letter to Governor Rauner and in the course of developing its "Competitive Retail Solution" ("CRS"), that, because it was designed for the needs of utilities in traditionally regulated areas, its capacity construct does not adequately provide for resource adequacy in Illinois. This suggests that MISO's capacity construct, including its planning resource auction, may not adequately compensate resources for the value they have in assuring long-term resource adequacy. The Zero Emissions Standard ("ZES"), included in P.A. 99-0906, addressed a similar concern, that market constructs existing at the time did not adequately compensate resources for certain of their positive environmental attributes. The legislature could, as it did with the ZES program, create a resource adequacy portfolio standard to compensate resources for the value they have in assuring long-term resource adequacy. If modeled upon the ZES, such legislation would presumably require the IPA, with ICC oversight, to procure resource adequacy credits from electric supply resources.

4. Reconfigure RTO Participation

Illinois is divided between two different regional transmission organizations, MISO and PJM. Differences in the characteristics of the participants in these markets and differences in the market rules between the two markets impact resources adequacy. For example, PJM relies almost solely on market mechanisms to ensure there is sufficient supply available to meet customer demand. MISO also provides market-based resource adequacy mechanisms but allows for state policy initiatives to be integrated into its resource adequacy construct.

A possible path to ensure resource adequacy would be for Illinois to encourage and/or require utilities to change their RTO participation choices. Notably, such reconfigurations may not come without cost. Existing obligations of the utilities may require them to pay certain "exit" fees should they elect to change their RTO participation choices. In addition, Section 16-126.1 of the Public Utilities Act currently prohibits the State from preventing a utility from participating in an RTO of its choosing.