

Staff Report

MIDWEST INDEPENDENT SYSTEM OPERATOR

-MISO-

July 7, 2009

Existing Conditions

As the utility interacts with other utilities, in the purchase and sale of power, there are basically three interaction levels – transmission connections, host control area, and regional reliability.

The City of Ames electrical system is connected to the outside world through two tie lines – a 161 kV line to Central Iowa Power Cooperative's (CIPCO) Boone Jct. substation and a 69 kV line to MidAmerican Energy's (MEC) Alleman substation.

Our **Host Control Area**, also call a **Balancing Authority**, is MEC. A Balancing Authority is responsible for the safe and reliable operation of the transmission grid within its purview. The Balancing Authority monitors flows, maintains voltage, coordinates facility outages, etc.

Over the past 100+ years that the Ames Municipal Electric System (AMES) has existed, utilities have moved from isolated, independent systems to an industry where cooperation, connection, and interdependence is the norm. It is one of the few industries where your neighbor can be a customer one minute, a competitor the next, a supplier the next, a partner, and an ally.

To facilitate this interdependence, **Regional Reliability Organizations** were formed. AMES currently is a member of the Mid-Continent Area Power Pool (MAPP). MAPP is an association of electric utilities and other electric industry participants. MAPP was organized in 1972 for the purpose of pooling generation and transmission. MAPP membership is voluntary and includes electric utilities and other industry participants who have interests in the Upper Midwest. MAPP is governed by the members it serves.

The MAPP organization has two primary functions: a regional transmission group responsible for facilitating open access of the transmission system and a generation reserve sharing pool which provides efficient and available generation to meet regional demand. These functions assure efficient and economical power in the upper Midwest for industry and the public interests.

From an AMES perspective, access to the electrical grid has been very beneficial. Over the years we have gained access to other sources of generation, increased reliability, and improved power quality. MAPP membership has afforded municipals like AMES fair and equal access to these markets.

MISO

In the mid to late 1990's the Federal Energy Regulatory Commission (FERC) came out with FERC Orders 888 and 889. In a nutshell, these orders were designed to separate the transmission delivery systems within a company from their generation resources. Although not widespread, there were cases where a vertically integrated utility would use control of its transmission for the betterment of its generation and to the detriment of others' generation. As an answer to this problem, in December 2001 the FERC approved MISO's application to become a **Regional Transmission Organization (RTO)** which began transmission service on Feb 1, 2002. MISO is independent (not run by the member utilities it serves) and a non-profit organization.

MISO vs. MAPP

From a transmission standpoint, MISO and MAPP perform similar functions.

In MAPP's operating model, the utilities retain operational control of its own transmission system, but works cooperatively in planning and reliability. If a utility's transmission facility is overloaded, MAPP can identify power purchase transactions that contribute to the problem and call for "cuts" to the transactions on a priority basis until the overload is relieved.

In MISO's operating model, the individual transmission systems are "turned over" to MISO. Another way of saying this is that all utilities "buy delivery service" from MISO and MISO then pays the owner of the use of the transmission system. To manage facility overloads, or congestion, MISO uses generation redispatch rather than curtailment of transactions. MISO took on somewhat of a change of scope in 2005 when it also launched into the Energy Markets. (see MISO Market below)

Since MISO's inception in 2002, utilities had an option of choosing which operating model best suited their needs. MISO has over time become the favored model by many of the original creators of MAPP. The hold outs have been MEC, CIPCO and most of the utilities in the Dakotas and Nebraska. (CIPCO remains a hold out, but its transmission system is so interwoven with Alliant's so that in some respects it is in MISO.)

Most recently, MISO has strengthened its dominance by using its ability to remove transmission constraints through generation dispatch for members and to cause non-members to lose transactions due to these cuts.

MISO Market

MISO administers the "market" for electricity producers and users on a wholesale level. MISO does not generate electricity for itself nor does it buy for itself. The MISO Energy and Operating Reserve Market consists of three components – Day Ahead Energy Market, Real Time Energy Market, and Financial Transmission Rights Market (FTR).

- **Day Ahead Markets** - This is a change in approach to traditional methods where AMES would locate sellers, negotiate a price, and arrange transmission. In the

MISO world, utility demand is bid/offered into the market as well as generation availability. The scheduled demand is then met at a price that results from this economic dispatch model. This price is called the Local Marginal Price (LMP) and is comprised of three components; Energy Price, Congestion Charges, and Losses). The market submittal closes at 11:00 a.m. EST the day before, and results are posted at 4:00 p.m. EST.

- **Real Time Market** - It is next to impossible to exactly match the day ahead schedule with the actual requirements of the demand. To meet this need there is a Real Time Market. This is the continuous process of balancing generation and demand at a least cost while recognizing current operating conditions. The real time closes 30 minutes prior to the hour. Prices are updated every 5 minutes and generator setpoint instructions are sent every 4 seconds.
- **Financial Transmission Rights** - This process provides a financial mechanism for Market Participants to manage the risk of congestion. However, because we do not have any long term contracts for firm transmission, we will not need to utilize this market.

To accomplish all of this, the MISO process is extremely data intensive!

MEC's Decision

Staff can only speculate why MEC has made the decision to join MISO. Since there are additional charges to move power in and out of MISO for non-members, generation redispatch is not available, opportunities to bid in excess generation are lost, and FERC favors those utilities that join an RTO, it would appear that MEC has made a business decision to join. After looking at several alternatives, in May the President of MEC meet with Ames and other municipals to inform us of their choice to join MISO by September 1, 2009.

Ames' Decision

It is important to note that Ames can remain a non-participant. We have generation and a transmission interconnection outside of MISO. However we would be isolated and, on a smaller scale, suffer the same limitation to energy markets as MEC does today. In addition, importing renewable generation while we are outside of MISO will difficult.

MAPP would remain as the regional reliability organization for the time being. However, it will soon shrink to a size where some of the most beneficial services it offers will cease. Schedule F, an economical transmission reservation system used quite often by Ames, will end April 1, 2011. Emergency Generation, once provided through MAPP, has already been transferred to MISO. MAPP itself is becoming increasingly isolated.

The ramifications of joining MISO are:

For the long term (starting 18 to 24 months from Sept 1, 2009), Ames will be well positioned and could benefit from MISO participation. We should receive transmission

revenue for the investments we've made in the 161 kV and possible even the 69 kV system, access to renewable generation will be simple and straightforward, enough transmission will exist to meet 100% of our requirements, and additional revenues may be gained by the marketing our excess generation. **It is important to emphasize that is not possible at this time to determine the ultimate cost of labor, energy price, data/systems.** Participation in MISO will no doubt result in higher costs to our system.

For the short term (since MEC's announcement in May through Sept 1, 2009 and for the next 18 to 24 months), Ames has a lot of work to do. MISO is a bureaucracy like no other. Whether we enter the market or not, as part of the MEC Balancing Authority it is in our best interest to make sure we are modeled and treated correctly. Four staff members have been spending 30-50% of their time learning about MISO, gathering data, meeting MEC/MISO deadlines, attending meetings, and training.

Ames strength as an independent municipal utility also hampers us somewhat in the short term. Until the 161 kV line is completed from Ames to Ankeny we are at a disadvantage in MISO. Nearly all MISO market participants purchase Network Transmission Service. These utilities purchase enough transmission to meet 100% of their load. Ames has not needed to do that since much of our load is served by our own generation. This requirement will simply be an increase in cost with no benefit. We are further harmed because there are import limitations placed on us by MEC. Therefore, we will pay for 100% of our load, but would be limited to firm deliveries of something in the neighborhood of 35-50% of our load.

Both of these problems go away when the new line goes in service, because MEC/MISO will recognize our 161 kV investments once we interconnect with MEC at a voltage higher than 100 kV. At that time, we hope to receive revenue credits for our system. (In the case of Cedar Falls and others, the credits more than offset the cost for network service.) The new line also alleviates the import restrictions into Ames.

In the final analysis, MISO is replacing MAPP for Ames as the regional reliability organization. Due to their operational model, it will bring about a fundamental shift in how we, and the other regional utilities, conduct business. For instance:

- We will now have to bid in our load
- We will now have to offer our generation
- Roles, activities, and some job functions within Electric Services, will need to be changed
- Bidding processes and analysis will need to be developed
- Communication links will need to be established (data will be shared in seconds rather days and weeks later)
- New MISO billing procedures must be established.
- Transmission delivery in the long run will no longer be a consideration
- Energy pricing will be posted and transparent

Final Comments

Over the long term, Ames is well positioned to participate and actually benefit from being a market participant in MISO. In the near term, we need to:

- Educate EUORAB and City Council on MISO and it's impact on Ames
- Provide MISO with current operational data,
- Look at alternative modeling to minimize negative impacts of being in the market,
- Accomplish alternative transmission to reduce cost impacts,
- Receive credit from MISO to transact in the day ahead and real time market, and
- Be prepared to enter the market on September 1

On June 24, 2009 the EUORAB met to review this matter and unanimously approved entering into the agreements to join MISO.