Midwest Independent Transmission System Operator (Midwest ISO)
Section 4 – Midwest ISO Performance Metrics and Other Information

On December 19, 2001, the Midwest Independent Transmission System Operator, Inc. ("Midwest ISO") became the nation’s first permanent Regional Transmission Organization to be approved by the Federal Energy Regulatory Commission ("FERC"). 34 transmission owners with approximately 93,600 miles of transmission lines and generation owners with 145,570 megawatts of electrical generation are currently participating in the Midwest ISO.

On December 15, 2001, the Midwest ISO began providing reliability coordination services to the transmission-owning members of the Midwest ISO and their customers. On the same date, the Midwest ISO also began providing operations planning, generation interconnection, maintenance coordination, long-term regional planning, market monitoring, and dispute resolution services. On February 1, 2002, the Midwest ISO began providing regional transmission service under its FERC-accepted Tariff. On April 1, 2005, the Midwest ISO began operating a market-based, congestion management system which included a Day-Ahead and Real-Time energy market and a Financial Transmissions Rights market. On January 6, 2009, the Midwest ISO began operating a market for ancillary services and became a NERC-certified Balancing Authority.

The Midwest ISO Value Proposition demonstrates the quantifiable value we deliver to our region through increased efficiencies in market operations, reliability and planning. Our 2009 Value Proposition demonstrates between $700 and $900 million in annual net benefits to our region.
A. Midwest ISO Bulk Power System Reliability

As of December 31, 2009, the Midwest ISO was registered with NERC and three Regional Reliability Organizations. The table below identifies which NERC Functional Model registrations the Midwest ISO has submitted as effective as of the end of 2009. Additionally, the Regional Entities for Midwest ISO are noted at the end of the table with a link to the websites for the specific reliability standards.

Violations of these standards are subject to potential violations findings by NERC. Violations could be identified via an investigation, self-report or audit. Each of these methods has a defined process by which NERC or the RRO would go through to validate that a violation had occurred and to publically announce that violation. As of the end of 2009, NERC had made no such violation announcement with regard to any Midwest ISO operation including operating reserve standards. The Midwest ISO has not shed any load in the Midwest ISO Region due to a standards violation.

<table>
<thead>
<tr>
<th>NERC Functional Model Registration</th>
<th>Midwest ISO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balancing Authority</td>
<td></td>
</tr>
<tr>
<td>Interchange Authority</td>
<td></td>
</tr>
<tr>
<td>Planning Authority</td>
<td></td>
</tr>
<tr>
<td>Reliability Coordinator</td>
<td></td>
</tr>
<tr>
<td>Resource Planner</td>
<td></td>
</tr>
<tr>
<td>Transmission Operator</td>
<td></td>
</tr>
<tr>
<td>Transmission Planner</td>
<td></td>
</tr>
<tr>
<td>Transmission Service Provider</td>
<td></td>
</tr>
</tbody>
</table>

| Regional Entities                      | ReliabilityFirst, MRO and SERC |

Standards that have been approved by the NERC Board of Trustees are available at:

Additional standards approved by the ReliabilityFirst Board are available at:
http://www.rfirst.org/Standards/ApprovedStandards.aspx

Additional standards approved by the MRO Board are available at:
http://www.midwestreliability.org/STA_approved_mro_standards.html

Additional standards approved by the SERC Board are available at:
http://www.serc1.org/Application/ContentPageView.aspx?ContentId=111
Dispatch Operations

Midwest ISO CPS-1 Compliance 2009

Each Balancing Authority is responsible for complying with CPS-1 standards. The Midwest ISO became a Balancing Authority on January 6, 2009 with the start of the Ancillary Services Market. As such, Midwest ISO’s compliance tracking started in 2009. Compliance with CPS-1 requires at least 100% throughout a 12-month period. At 137.8%, the Midwest ISO was in compliance with CPS-1 for 2009.

Midwest ISO CPS-2 Compliance 2009

Each Balancing Authority is responsible for complying with CPS-2 standards or alternatively for complying with the Balance Authority Ace Limit (BAAL) which is currently being evaluated by NERC as a potential replacement for CPS-2. The Midwest ISO is participating in the NERC field test of the BAAL standard and hence monitors against that standard. The Midwest ISO became a Balancing Authority on January 6, 2009 with the start of the Ancillary Services Market. As such, Midwest ISO’s compliance tracking started in 2009. For 2009, the Midwest ISO did not have any violations of the standard.

Midwest ISO Transmission Load Relief or Unscheduled Flow Relief Events 2005-2009

The Midwest ISO’s data reflects the number of Transmission Load Relief (TLR) events. The Midwest ISO’s TLR events were comprised of primarily level 3, and 4 events with level 5 events of 4%, 5%, 4% and 10% in 2006 through 2009. The reduction in TLRs for 2008 and 2009 is due to several factors including system reinforcements, lower load levels, and market operation. Primarily non-firm curtailments, the monthly average curtailments in MWh were 151,842; 87,090; 111,550; and 76,541 in 2006 through 2009. The Midwest ISO does not have readily accessible data for 2005.
Availability of the Energy Management System (EMS) is key to reliable monitoring of the electric transmission system in the Midwest ISO Region. For the past five years, Midwest ISO's EMS has been available 99.9% or greater of all hours in each year.
Load Forecast Accuracy

The Midwest ISO monitors load forecasting accuracy with regards to several different time reference points. The Midwest ISO’s load forecasting accuracy has been relatively steady over the last 3 years. The day-ahead load forecasting accuracy reference point is 4:30 p.m. of the prior day and is the reference point for the data shown below. Load forecasting data is not available for 2005 and 2006. In the future, the Midwest ISO will retain the additional periods requested for this report.

The day-ahead load forecast does not account for the impact of interruptible load and demand response resources. Interruptible loads and DRR have an immaterial effect on the forecast considering the size of the Midwest ISO load.

Midwest ISO Average Load Forecasting Accuracy 2007-2009
While the Midwest ISO does not procure capacity on behalf of Load Serving Entities (LSE), the peak demand forecasts created and submitted by each LSE directly determines the amount of capacity that each LSE must designate (potentially procure if short) to meet their planning resource obligations. If a LSE under forecasts its peak demand this would result in the LSE under designating (or procuring) capacity which could result in potential reliability issue. Alternatively, when an LSE over forecasts its peak demand, it will over designate (or procure) its capacity. This results in inefficient capacity procurement.
Wind Forecasting Accuracy

The Midwest ISO’s wind forecasting accuracy for 2009 was 92.83%. Wind forecasting accuracy data prior to 2009 is not available. Wind forecasting accuracy is calculated using an industry-wide methodology called Mean Absolute Error (MAE). The MAE is the average of the absolute value of the difference between forecasted and actual wind power output and is expressed as a percent of installed wind nameplate capacity. The wind forecasting accuracy is represented as one minus MAE.

The wind forecasting calculation methodology differs from the calculation methodology used for the load forecasting accuracy metric because the wind forecasting calculation methodology expresses the absolute error value as a percent of installed wind nameplate capacity whereas the load forecasting calculation methodology expresses the absolute error value as a percent of total forecasted load. The wind forecasting calculation methodology “softens” the true error in forecasting.

The Midwest ISO is continuing to explore methods for improving the accuracy of its wind forecasting, but our current accuracy appears to be consistent with the accuracy obtained in other regions throughout the world.
Unscheduled Flows

Midwest ISO 2009 Absolute Value of Total Unscheduled Flows

The Midwest ISO had an absolute value of 38 terawatt hours of unscheduled flows in 2009. This unscheduled flow occurred over 23 external interfaces. The Midwest ISO is reporting data starting on January 6, 2009 when its Ancillary Services Market started and a new scheduling system was introduced. The Midwest ISO replaced its scheduling system during that transition. While the data from that system has been retained, access to the data in this type of configuration is not readily available.

Midwest ISO 2009 Absolute Value of Unscheduled Flows as a Percentage of Total Flows

The Midwest ISO’s absolute value of total hours of unscheduled flows as a percentage of total flows was 7.1% in 2009. As previously mentioned, the Midwest ISO is reporting data starting on January 6, 2009 when its Ancillary Services Market started and a new scheduling system was introduced. The Midwest ISO replaced its scheduling system during that transition. While the data from that system has been retained, access to the data in this type of configuration is not readily available.

Unscheduled flows for the top five interfaces are shown in the table below:

<table>
<thead>
<tr>
<th>Midwest ISO Unscheduled Flows by Interface</th>
<th>2009 (in terawatt hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PJM</td>
<td>(7)</td>
</tr>
<tr>
<td>Ohio Valley Electric Cooperative</td>
<td>(6)</td>
</tr>
<tr>
<td>Electric Energy, Inc.</td>
<td>5</td>
</tr>
<tr>
<td>Tennessee Valley Authority</td>
<td>4</td>
</tr>
<tr>
<td>Ontario Independent Electricity System Operator</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: A positive value denotes unscheduled flows into the ISO/RTO; a negative value denotes unscheduled flows out of the ISO/RTO.

Parallel flows are a function of the interconnection’s operating configuration, the resistance and physics. Another characteristic of parallel flows is that they sum to zero when all interfaces between a BA and all neighboring BAs are considered. While parallel flows from outside entities may create additional transmission system losses on a system, the real concern is the congestion the parallel flows create and the costs that are incurred when parallel flows cause facilities to exceed their limits. Parallel flows from outside entities are not limited to neighboring BAs. The Midwest ISO experiences parallel flows from other BAs that do not have an interconnection with the Midwest ISO.

The Midwest ISO has two methods to deal with congestion caused by parallel flows. The first method, the Transmission Loading Relief (TLR) approach, was developed by NERC and aims to reduce the harmful impacts of parallel flows by curtailing transactions between areas. The second method, the Congestion Management Process (CMP) approach, assigns firm flowgate rights among seams entities that are used when congestion occurs and
redispatch obligations are made based on flowgate curtailment priorities. Seams agreements that contain CMPs exist between Midwest ISO, PJM, SPP, TVA, MAPP entities and Manitoba Hydro. Midwest ISO is working with IESO, NYISO and PJM to address Lake Erie loop flows through a number of initiatives including the operation of the phase angle regulators (PARs) on the MI-ONT interface.
**Transmission Outage Coordination**

The Midwest ISO’s transmission owners are required to request advance approval of transmission outages associated with scheduled maintenance. The Midwest ISO is required to study and approve or disapprove those requests within certain time periods. The following metrics reflect the performance of the parties with respect to this transmission outage coordination.

**Midwest ISO Percentage of > 200kV planned outages of 5 days or more that are submitted to ISO/RTO at least 1 month prior to the outage commencement date 2005-2009**

![Graph showing percentage of planned outages submitted at least 1 month prior to commencement from 2005 to 2009.]

**Midwest ISO Percentage of planned outages studied in the respective ISO/RTO Tariff/Manual established timeframes 2005-2009**

![Graph showing percentage of planned outages studied within established timeframes from 2005 to 2009.]

The Midwest ISO’s business practices allow for exceptions (i.e. extensions) to its planned outage study timeframe in prescribed situations. However, the Midwest ISO does not track those extensions in a centralized location. Therefore, the Midwest ISO statistics shown above do not account for these prescribed extensions and represent lower than actual performance.
The Midwest ISO has the authority to cancel or reschedule previously-approved planned transmission outages if such outages would jeopardize system reliability conditions. However, the Midwest ISO has only needed to cancel or reschedule a very small percentage of transmission outages that it had previously approved.

Unplanned transmission outages may occur due to equipment malfunctions on the transmission line or an adjacent substation. They can also occur due to weather conditions that cause a transmission facility to trip out of service. Over the 2005 – 2009 time period, 20 – 22% of the outages of transmission assets in the Midwest ISO Region with 200 kV or higher voltages have been unplanned.
The impact of transmission outages on generation availability and on declared emergencies is mitigated by provisions in the Midwest ISO Tariff and Outage Operations Business Practices. All transmission and generation outage requests are submitted and reviewed/approved by the Midwest ISO prior to implementing. Generally, generation outage requests are required to be submitted prior to submission of transmission outage requests. Transmission outage requests are then analyzed and approved or rescheduled to maintain transmission system reliability and minimize impact on generation availability. Transmission outage requests are also analyzed, approved or cancelled such that the outage does not result in a declared emergency. The metric indicating percentage of outages cancelled by Midwest ISO is very low, averaging less than a tenth of a percent over the last five years, demonstrating appropriate outage coordination maintains transmission reliability and generation availability.
Transmission Planning

The Midwest ISO follows a top-down, bottom-up planning process intended to address reliability, economic, and public policy-driven transmission needs. The process focuses efforts on identifying issues and opportunities to strengthen the transmission system, developing alternatives for consideration, and evaluating those options to determine effective solutions. The goal is to identify transmission projects:

- Ensuring the reliability of the transmission system
- Providing economic benefit, such as increasing market efficiency
- Facilitating public policy objectives, such as the integration of renewable energy
- Addressing other issues or goals identified through the stakeholder process

As part of the bottom-up process, Transmission Owners in the Midwest ISO are responsible for submitting their transmission construction plans to the Midwest ISO for evaluation and possible inclusion in Appendix A of the Midwest ISO Transmission Expansion Plan (MTEP). The Midwest ISO, in conjunction with its Transmission Owners and other stakeholders, also develops plans to address outstanding needs through the top-down process.

After thorough analysis, projects identified as the best solution for a particular issue or opportunity are included in Appendix A of the MTEP report and recommended for approval by the Midwest ISO Board of Directors (BOD). Once approved by the BOD, the Transmission Owner is required to make a good faith effort to complete the project. The following metrics give insight into the process and its results.
Projects that appear to meet a planning need but require further analysis are assigned to Appendix B until it is determined that these projects are the best alternative to identified issues. Finally, Appendix C contains projects still in the conceptual stages. Once analyzed and—if justified—projects currently in Appendices B and C move to Appendix A for approval and construction in future MTEP reports.

Value Based Planning Process

The uncertainties surrounding future policy decisions create challenges for those involved in the planning function and causes hesitancy for those with the resources to undertake transmission expansion projects. To minimize the risk in building a system under such conditions, the planning process must consider transmission projects in the context of all potential outcomes. The goal is to identify plans resulting in the least amount of future regrets in areas such as cost incurred, right of way used, and benefits achieved. This Value Based Planning Process seeks to meet this challenge through the execution of seven steps, including:

- Defining potential future energy policy outcomes
- Identifying generation capacity expansions that must occur in order to meet the objectives of each future scenario
- Modeling the potential location of generation
- Designing a conceptual transmission plan under each future
- Robustness testing to identify projects that perform well under most—if not all—future scenarios
- Testing the transmission plan against reliability criteria
- Determining cost allocation
Projects developed through this process are submitted into the MTEP Appendices for further analysis and potential Appendix A inclusion.

Demand response and energy efficiency programs and their impacts are currently reflected in the cumulative demand and energy growth rates. If a particular combination of Demand Side Management (DSM) programs is found to be economically viable, then the DSM programs will be included in the transmission planning and economic models as future generation units, and a lower demand will be reflected due to the energy efficiency programs. This in turn will have an impact on preliminary transmission portfolio design and affect—to greater or lesser degrees—the overall robust transmission overlay that will be proposed. The degree of DSM’s impact on the regional plan, although dependent on many variables, may be substantially lessened if the transfer capability of the system is too low. If the transfer limits of the system are insufficient, DSM resources that may be the most economic may become trapped behind a transmission constraint.

Demand response may also be considered as a solution to an identified transmission issue. In order for demand response to be used as a solution, it must be evaluated in the Midwest ISO planning process, found to be the most effective solution, and have equivalent certainty to its alternative projects. This equivalent certainty will most likely be in the form of a legally binding contract forcing the demand response solution to be implemented, similar to the conditions required for an MTEP Appendix A transmission project.

With the addition of significant amounts of intermittent resources such as wind turbines to the transmission grid, the ability to store large amounts of energy for use during high demand times is becoming more important. Energy storage is becoming economical through the implementation of new technologies such as large-scale battery systems, flywheels, modifying the dispatch of wind generation to supply ancillary service products, and compressed air energy storage. The Midwest ISO is currently investigating the impact of energy storage on its planning models and future-based scenarios. A full-scale evaluation of energy storage is anticipated for the MTEP 11 planning cycle.

Midwest ISO Performance of Order 890 Planning Process

A key element of the Order 890 Planning Requirements is the involvement of transmission customers early and throughout the planning process. Subregional Planning Meetings (SPMs) are held in the West, Central and East planning regions of Midwest ISO. These SPMs provide forums for stakeholders to obtain information and to provide feedback on transmission project proposed in the current cycle.

In accordance with Order 890, Midwest ISO completed the following reliability studies in 2009: AC contingency, dynamic stability, voltage stability, load deliverability and generation deliverability. Midwest ISO also completed an economic transmission study during 2009. The results of these studies can be found on the MTEP 2009 report.

The MTEP 2009 report is available at www.midwestiso.org.
In 2008, the Midwest ISO moved the focus of its process from “first in-first out” to “first ready-first served.” With that basic fundamental shift, customers now pay deposits scaled towards the size of their requests, and must show progress in non-transmission aspects of their project to proceed into later phases of the process. Within 18 months of the reform, over 230 requests received their system impact study report, compared to 40-50 per year prior to the reform.

The Midwest ISO’s resource adequacy mechanism was established in 2009. Prior to that time reserve margins were set by the Regional Reliability Organizations in the area. The Midwest ISO does not have a centrally procured capacity market. Load Serving Entities are required to designate specific capacity to meet their individual requirements. They may obtain that capacity via any of several ways including construction, bilateral contracts, existing generation, demand response, behind-the-meter generation (BTMG), or even through the Midwest ISO’s
voluntary capacity auction. Demand Response and BTMG are defined as planning resources in the Midwest ISO resource adequacy mechanism and are called Load Modifying Resources (LMR). LMR are required to meet specific criteria established by the Midwest ISO’s Module E in order to be registered and eligible to be used to meet LSE’s capacity requirements.

Demand response resources can be used to meet the region’s resource adequacy requirements. As shown in the chart below, demand response capacity as a percentage of total capacity rose from 2.5% in 2005 to 3.8% in 2009. The Midwest ISO also allows demand response resources that meet specified requirements to participate in the following markets: energy, regulation, spinning reserves and non-spinning reserves. Demand response resources are actively participating in each of these areas.

The Midwest ISO fosters demand response in the region through dynamic pricing and direct load control/interruptibles. As a result, generation infrastructure investment is deferred by reducing load during times of system peaks. The Midwest ISO has over 12,500 MW of total demand response capability. The deferral of generation infrastructure investment represents theoretical savings of $80 million in 2009 with the anticipation that savings will increase in future years.
Forecasted peak demands are submitted by LSE’s using a 50%-50% forecast (50% probability the forecast will be over, and 50% probability the forecast will be under, the actual peak demand) using CPNode granularity and including all losses downstream from the generator bus (transmission and distribution).

LSEs must report their non-coincident peak forecasted Demand to the Midwest ISO at each CPNode for each month of the next two Planning Years and also for each summer period (May - October) and winter period (November - April) for an additional eight (8) Planning Years. The forecasts shall be based upon considerations including, but not limited to, average historical weather conditions and expected Load changes (addition or subtraction of demand). LSEs will separately register Demand Resources that qualify under Module E in order to have them subtracted from their forecasted Demand.

The Midwest ISO will calculate the Forecast LSE Requirement as the forecasted Demand for an LSE (adjusted by DR that are registered to net) for each month of the next Planning Year.

Forecasts of Demand are subject to after-the-fact assessments using standard deviation bandwidths and normalization factors provided by LSEs to identify potentially improper forecasting.

Within Module E, individual Load Serving Entities (LSEs) maintain reserves based on their monthly peak load forecasts. These peak forecasts do not sum to the system coincident peak because they are reported based solely on the entity’s own peak, which could occur at a different time than the system peak. To account for this diversity within the system, a reserve margin was calculated for application to individual LSE peaks utilizing a diversity factor. This resulted in an individual LSE reserve level that is reduced from what would otherwise be a higher reserve without accounting for diversity.

The reduced reserve level delays the need for new capacity. For the most of Midwest ISO’s membership, the recent economic downturn resulted in load reductions, and thus excess generation capacity to the point that under the present conditions this benefit will not rematerialize for the next few years. The Midwest ISO 2009 Value Proposition calculates a theoretical benefit of $217 to $272 assuming no excess capacity based on the cost of building new combustion turbine capacity. The benefit is the avoided annual revenue requirement of that avoided capacity.

There are numerous factors that impact the adequacy of the actual reserve margin vis-à-vis the projected reserve margin, including load forecasts and energy efficiency trends. When the Midwest ISO calculates the Planning Reserve Margin (PRM), there are a number of key factors that impact the results:

- Congestion: changes in the amount of transmission congestion on the Midwest ISO system. Congestion incorporates the notion of aggregate deliverability impact and a quantifiable MW capacity impact upon LOLE achieved.
- Load Forecast Uncertainty (LFU): the Midwest ISO utilizes the summation of the NERC Variances method to calculate the load forecast uncertainty value. This method produces a sigma value. The Summation of the NERC Variances method has a solid methodology and the NERC Load Forecasting Working Group (LFWG) has consistent input from Midwest ISO membership. More forecast error is introduced for example due to the recent economic downturn.
• Forced Outage Rates: Forced outage rates are adjusted to exclude certain outage types, deemed as outside of management control, and account for the time when a unit was in demand. These adjustments to the forced outage rates yielded an Effective Forced Outage Rate Demand (EFORd) that excluded certain outages which is known as XEFORd.

• External Support: the Midwest ISO determines the level of support the external systems can provide based on historical total transmission flows and contractual flows. That applicable external support level is held to the same reliability level as the internal system.

• Membership Changes: the impact of the entrance and departure of members from the Midwest ISO market and reliability systems are factored into the PRM determination. For example, for the 2011-2012 Planning Year, the entrance of Dairyland Power Cooperative and Big Rivers Electric Cooperative and the departure of FirstEnergy resulted in changes to the PRM.

• Modeling Improvements: as the Midwest ISO compiles more accurate and comprehensive data on modeling factors such as generator performance, outages, load shapes, etc. that data improves the accuracy of the results.

The chart above includes cancelled generation outages that were denied or revoked by the Midwest ISO. The Midwest ISO does not have data available for 2005. Percentage of generation outages cancelled was 0.0% for 2006 and 2007.
When a generating unit that wishes to retire or be mothballed is required to continue to operate for reliability purposes it is known in the Midwest ISO as a System Support Resource. The Midwest ISO had no units under these types of contracts from 2005 through 2009.

**Interconnection / Transmission Service Requests**

In 2008, the Midwest ISO moved the focus of its generator interconnection process from “first in-first out” to “first ready-first served.” With that basic fundamental shift, customers now pay deposits scaled towards the size of their requests, and must show progress in non-transmission aspects of their project to proceed into later phases of the process. Within 18 months of the reform, over 230 requests received their system impact study report, compared to 40-50 per year prior to the reform.

Since the shift in paradigm, the Midwest ISO has seen a generally steady, if reduced, number of interconnection requests entering the queue, and the Midwest ISO has seen resistance from some customers in leaving the queue at the end of their studies. The deposit changes, in conjunction with the additional education provided to generation developers seeking to enter the process, leads to additional consideration before the submission is made, which is believed to be one driver for the reduction in study requests received. The nature of the queued requests, which are mostly wind, and the current demand for wind energy, or lack thereof, are believed to be the drivers for customers to push to stay in the queue at this point in time. Unexecuted agreements and the current formal complaint mostly center around cost allocation and related issues. Once those issues are resolved, supply/demand market forces are expected to dominate the queue debate.

Recent trends in Interconnection Requests, and Transmission Service Requests, continue to revolve around wind energy, either connecting new wind generators or moving the output of wind generators across, and sometimes out of, the Midwest ISO. Study results over the last 2-3 years have shown the need for projects such as those currently defined as “Candidate MVPs” in the Midwest ISO’s continuation of the Regional Generator Outlet Study. The proposed cost allocation changes, along with the progress to-date on meeting renewable portfolio standard laws in the Midwest region, has incented a “wait and see” approach from a large number of customers in the later stages of the queue.
The uptick in completed studies in 2007 and 2008 reflects the process changes which allowed those requests that were able to move more quickly due to a combined project readiness and system readiness (i.e. projects in relatively unconstrained areas), to move more quickly to interconnection agreement. Although not reflected in the chart, note that requests withdraw from the queue on a regular basis for economic or other reasons. Of the 692 requests received in 2005-2009, more than a quarter have already made a decision to withdraw.

The Midwest ISO’s average aging for incomplete studies for 2009 was 710 days. Average aging data prior to 2009 isn’t readily available. The average aging of 710 days is reflective of the former first in-first out approach to queue processing being applied to a queue with a concentration of requests in a relatively small area. Following the queue
reform, the number is staying large as those legacy projects are now facing 345kV upgrades and questions over appropriate allocation of those larger upgrades. Further complicating this issue is a restudy resulting from an unexecuted interconnection agreement in our oldest group study. The result of that study can change the baseline assumptions for the subsequent studies, and may alter those results.

**Midwest ISO Average Time to Complete Studies 2005-2009**

*calendar days*

Although the transmission studies for generator interconnection become increasingly more complex as more resources seek to locate in highly constrained areas, techniques such as the group study result in not only increased efficiencies identified in the transmission plans themselves, but also allow efficiencies in the project study process which keep the costs relatively steady from year to year.

**Midwest ISO Average Cost of Studies Completed 2005-2009**
**Special Protection Schemes**

**Midwest ISO Number of Special Protection Schemes 2009**

The Midwest ISO had 53 special protection schemes in 2009. Of the 53 SPSs, Midwest ISO’s West Region had 34 SPSs, the Central Region had 6, and the East Region had 13. In 2009, there were no intentional misoperations of SPSs in the Midwest ISO. There was one unintentional misoperation of a SPS, but the SPS responded as designed.
B. Midwest ISO Coordinated Wholesale Power Markets

For context, the table below represents the split of the $24.3 billion dollars billed by Midwest ISO in 2009 into the primary types of charges its members incurred for their transactions.

<table>
<thead>
<tr>
<th>(dollars in millions)</th>
<th>2009 Dollars Billed</th>
<th>Percentage of 2009 Dollars Billed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>$ 21,173.0</td>
<td>87.1%</td>
</tr>
<tr>
<td>FTR</td>
<td>1,396.2</td>
<td>5.8%</td>
</tr>
<tr>
<td>Transmission Service</td>
<td>1,238.1</td>
<td>5.1%</td>
</tr>
<tr>
<td>Administrative Costs</td>
<td>252.1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Regulation Market</td>
<td>123.1</td>
<td>0.5%</td>
</tr>
<tr>
<td>Contingency Reserves</td>
<td>79.6</td>
<td>0.3%</td>
</tr>
<tr>
<td>Resource Adequacy</td>
<td>7.4</td>
<td>0.0%</td>
</tr>
<tr>
<td>Other</td>
<td>46.5</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$ 24,316.0</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

In addition, Midwest ISO’s demand response as a percentage of the synchronized reserve market was 3.9% in 2009. Midwest ISO’s demand response as a percentage of the regulation market was 2.7% in 2009. Midwest ISO launched its ancillary services market in January 2009. Therefore, there was no demand response participation in Midwest ISO ancillary services market prior to 2009.
Market Competitiveness

The Midwest ISO calculates price cost markup by comparing the system marginal price based on actual offers to a simulated system marginal price based on assuming suppliers had all submitted offers at their estimated marginal costs.

The overall price cost markup percentages over the past three years support the conclusion that prices in the Midwest ISO are set, on average, by marginal units operating at or close to their marginal costs. The Midwest ISO does not have data for this metric for 2005 and 2006.
In 2009, Midwest ISO markets would not have supported investment in either gas CT or CC generation units based on their annualized costs of new investment. The Midwest ISO footprint has a sizable capacity surplus that precluded significant periods of shortage, particularly at reduced load levels.

The Midwest ISO’s mitigation measures are intended to preclude abuses of locational market power while minimizing interference with the market when the market is workably competitive. The Midwest ISO only imposes mitigation measures when suppliers’ conduct exceeds well-defined conduct thresholds and when the effect of that conduct on market outcomes exceeds well-defined market impact thresholds. By applying these conduct and impact tests, the mitigation measures are designed to allow prices to rise efficiently to reflect legitimate supply shortages, while
effectively mitigating inflated prices associated with artificial shortages that result from physical or economic withholding in transmission-constrained areas.

In the years 2005 to 2009, total unit hours mitigated in a year ranged from 19 hours to 498 hours. Consequently, the unit hours offer capped due to mitigation is extremely small when calculated as a percentage of total unit hours.

Potomac Economics, the Midwest ISO’s Independent Market Monitor, provides a competitive assessment of the Midwest ISO markets in its 2009 State of the Market Report that includes a review of potential market power indicators, an evaluation of participants’ conduct, and a summary of the imposition of mitigation measures in 2009. Potomac Economics concludes:

“Our analysis shows that market concentration measured using the Herfindahl-Hirschman Index (“HHI”) is low for the overall Midwest ISO region, although it is considerably higher in the individual regions.

However, a more reliable indicator of potential market power is whether a supplier is “pivotal”, which occurs when its resources are necessary to satisfy load or manage a constraint. In the examination of pivotal suppliers, we focus particular attention on the two types of constrained areas that are defined for purposes of market power mitigation: Narrow Constrained Areas (“NCA”) and Broad Constrained Areas (“BCA”). NCAs are chronically constrained areas – three are currently defined: one in Minnesota, one in WUMS, and one in North WUMS (a subset of WUMS) – that raise more severe potential local market power concerns (so tighter market power mitigation measures are employed), while BCAs include all other areas within the Midwest ISO that are isolated by a binding transmission constraint.

Sixty-four percent of active BCA constraints had a pivotal supplier in 2009, up from 59 percent in 2008. Seventy-five percent of the active NCA constraints into WUMS have a pivotal supplier (down from 79 percent in 2009), as do 75 percent of the active NCA constraints into Minnesota (up from 69 percent). In addition, nearly 80 percent of all intervals in 2009 exhibited an active BCA constraint with at least one pivotal supplier, while 30 percent and 6.5 percent of the intervals exhibited an active NCA constraint with at least one pivotal supplier in WUMS and Minnesota, respectively. These results indicate that local market power persists with respect to both BCA and NCA constraints, and that market power mitigation measures remain critical.

Although the report shows that structural market power remains a significant issue in the Midwest ISO, our analyses of participant conduct show little evidence of attempts to physically or economically withhold resources to exercise market power.”

Midwest ISO’s 2009 State of the Market Report also states that, “Market power mitigation in the Midwest ISO’s energy market continues to occur pursuant to automated conduct and impact tests that utilize clearly specified criteria. Because conduct has generally been competitive, market power mitigation has been imposed infrequently.”
With respect to price volatility, Midwest ISO’s 2009 State of the Market Report states:

“Prices in the real-time market are generally more volatile than prices in the day-ahead market. However, real-time price volatility decreased 17 percent in 2009, due in part to the introduction of ASM. ASM has resulted in improved supply flexibility that allows the real-time market to satisfy the system’s demands with less price volatility. Volatility in the Midwest ISO remained substantially higher than in neighboring RTOs because the Midwest ISO runs a true five-minute real-time market that produces a new dispatch and prices every five minutes.”
The average annual load-weighted wholesale energy prices substantially reflect the changes in fuel costs. These trends are supported by the chart below that shows the trends in the costs of key fuel sources for generation units in the U.S. electricity industry.

**Peak Price Trends**

<table>
<thead>
<tr>
<th>Time</th>
<th>MISO Real-Time Load (MW)</th>
<th>Day-Ahead LMP ($/MWh)</th>
<th>Real-Time LMP ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/3/2005 16:00</td>
<td>105,525</td>
<td>$136.67</td>
<td>$129.05</td>
</tr>
<tr>
<td>7/31/2006 16:00</td>
<td>109,065</td>
<td>$222.72</td>
<td>$268.21</td>
</tr>
<tr>
<td>8/8/2007 15:00</td>
<td>103,997</td>
<td>$148.08</td>
<td>$225.64</td>
</tr>
<tr>
<td>7/29/2008 15:00</td>
<td>98,263</td>
<td>$157.92</td>
<td>$182.77</td>
</tr>
<tr>
<td>6/25/2009 14:00</td>
<td>96,334</td>
<td>$63.32</td>
<td>$46.69</td>
</tr>
</tbody>
</table>

Day-ahead and real-time LMPs at the annual Midwest ISO system peak load hour show the strong correlation between the load and prices. The LMPs from 2005 to 2007 moved in the same direction as the changes in real-time load. However, in 2008 increased fuel prices across all fuel types may have caused the LMPs to be higher than 2007 albeit the peak load actually declined. The 2008 and 2009 LMPs are influenced by the broad economic slowdown and decline in weather induced electric demand due to relatively milder weather. In addition to the lower demand, in 2009 fuel prices declined causing a significant drop in LMPs compared to 2008.

Source: U.S. Energy Information Administration, Independent Statistics and Analysis

($/megawatt-hour)

(1) Midwest ISO 2005 data begins April 1, 2005 reflecting the start of the Midwest ISO Real-Time Energy Market

(2) Midwest ISO’s base year for fuel-cost references is 2004.
On an annual basis, energy costs have comprised 91 – 94% of Midwest ISO’s total wholesale power costs for the past five years. All other components of Midwest ISO’s wholesale power cost per megawatt hour account for less than 6 – 9% of the total costs per megawatt hour. In particular, the operating reserve costs (sometime referred to as uplift) vary from year to year, but represent on average less than $1.00 per megawatt hour of the total wholesale power cost in the Midwest ISO Region. In 2005 through 2009, such uplift costs represented 2.2% or less of the total wholesale power cost per megawatt hour during that five-year period.

Impacts of Demand Response on Market Prices

The Midwest ISO continues to enhance the ability of demand response to participate in its markets, including energy, ancillary services, and capacity. Efforts are ongoing to identify potential barriers and to provide solutions that encourage Market Participants to include demand response in their market portfolios. While the footprint has been long in capacity for some time, demand response has demonstrated its long-term potential during certain periods. For example, during the August 1st, 2006 event, approximately 3,000 MW’s of demand response responded for ten hours. Corresponding clearing prices during this window declined by $100 - $200/MWh for participant (gross) savings of over $3,000,000. Market participants benefitted from the reduction in energy prices as well as from the reliability assistance provided to the system.
Pricing in the Midwest ISO wholesale markets is heavily influenced by underlying fuel prices. The values in the table above reflect the fuel price increases experienced in 2005 and 2008 as well as the fuel price decrease in 2009.

(1) Midwest ISO 2005 data begins April 1, 2005 reflecting the start of the Midwest ISO Real-Time Energy Market
(2) These values were calculated based on the annual average non-weighted Real-Time marginal energy component of LMP at the Cinergy Hub. Using the marginal energy component of LMP is consistent with how Midwest ISO publishes System Lambda in FERC Form No. 714.
**Energy Market Price Convergence**


The data in the chart above reflects significant convergence between day-ahead and real-time prices since Midwest ISO’s day-ahead and real-time markets started in 2005.

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(1) Midwest ISO 2005 data begins April 1, 2005 reflecting the start of the Midwest ISO Real-Time Energy Market
**Congestion Management**

Midwest ISO Annual Congestion Costs per Megawatt Hour of Load Served 2005-2009(1)

![Graph showing congestion costs per year from 2005 to 2009.](image)

(1) Midwest ISO 2005 data begins April 1, 2005 reflecting the start of the Midwest ISO Real-Time and Day-Ahead Energy Markets

Congestion costs have been declining due to two primary factors, the addition of transmission to relieve congestion in certain key areas of the Midwest ISO footprint and a significant decrease in load within the footprint due to the economic environment. These factors have resulted in the decreased average congestion costs shown from 2007 to 2009.

In 2010, the Midwest ISO continued its evaluation of market-based congestion through analyzing the top 44 flowgates which have been congested more than 1% of the time since market launch. These flowgates were analyzed for trends and potential mitigation. It was determined that, of the top 44 congested flowgates, 34.1% had their congestion eliminated or relieved by transmission solutions proposed through the long-term, reliability based planning process. An additional 22.7% of the flowgates had their congestion alleviated or mitigated through congestion-specific targeted studies (such as the Midwest ISO Top Congested Flowgate Study or the Cross Border Congested Flowgate Study) in MTEP09 and MTEP10. The remaining 29.5% and 13.6% of these congested flowgates were coordinated and Midwest ISO flowgates, respectively, that did not have solutions identified. Continuing to address congestion is a critical component to the maintenance of a low reserve margin. For example, it is estimated by 2015 that congestion will require an incremental contribution to the reserve margin of 1.6%.

It should be stressed that not all of the proposed mitigation identified in the congestion-specific studies was implemented. A majority of the mitigation identified did not meet the cost-benefit requirements or voltage standards of the Midwest ISO or cross border cost allocation methodology. This mitigation was still eligible for construction, if a Midwest ISO stakeholder or market participant deemed it economically feasible to sponsor the mitigation.
When engaging in expansion planning, careful consideration is necessary to identify transmission investments required to address chronic congestion as opposed to impulsively reacting to acute but short-lived congestion. It is also important to note congestion on a particular flowgate may have only taken place part of the time in the relatively short five-year span of the market; thus, discretion should be taken before regarding historical congestion information as the sole consideration driving long-term expansion.

The relationship between congestion revenues collected by the Midwest ISO and congestion payments to FTR holders is correlated with, but not equal to, congestion cost incurred by Load Serving Entities ("LSEs"). FTR value is paid to FTR holders whether or not the generator source used to serve LSE load matches an FTR source. Under least-cost regional dispatch, generation from sources other than the FTR source will be utilized when it is cost effective. As a result, FTR value may exceed congestion costs incurred for a particular FTR source and sink path. In addition, FTR holders receive revenues to offset congestion costs from sources other than FTRs. Specifically, in addition to FTR revenues realized from the Day-Ahead market, LSEs receive an allocation of FTR/ARR auction revenue. Including ARR revenues, Market Participants were funded at 96.7% in 2008 and 100.8% in 2009 after the transition from the FTR to the ARR/LTTR market mechanism.
For the Midwest ISO, the most significant driver of generation availability is the availability of actual generator performance data. In previous years leading up to the implementation of the Midwest ISO’s capacity construct launched beginning June 2009, the Midwest ISO received Generator Availability Data System (GADS) data for approximately 70% of the units operating in the Midwest ISO footprint. The balance of the units received a NERC class average. As we began replacing the class average values with actual GADS data the average Forced Outage Rates (FOR) improved in both their accuracy and capability for the Midwest ISO to calculate Unforced Capacity (UCAP) ratings used for Resource Adequacy. The Midwest ISO believes that meaningful tracking of the generator availability in the Midwest ISO begins with the June 2009-May 2010 Resource Planning Year for Resource Adequacy.

Midwest ISO’s 2009 Value Proposition quantifies the benefit of improved generator availability using the Equivalent Availability Factor. The Midwest ISO’s wholesale power market has resulted in power plant availability improvements of 3.1% delaying the need to construct generation infrastructure. The deferral of generation infrastructure investment represents theoretical savings of $249 to $311 million in 2009.
Out-of-merit dispatch

The frequency of out-of-merit dispatch within the Midwest ISO market is captured by transmission constraint binding hours. The Midwest ISO has seen an increase in the number of hours that constraints are bound since 2009. During 2009 there were a total of 9,745 hours of binding while through October of 2010 there have been 9,682 binding hours. A summer that included extremely hot conditions contributed significantly to the increase in binding. The tools that the Midwest ISO uses to manage constraints allow for more economical and efficient solutions that more directly impact the source of congestion. The use of a market-based Security Constrained Economic Dispatch (SCED) allows constraints to be managed in the most economical manner while allowing for maximum use of the transmission system.

Reduction of market constraints / market efficiency analysis

Midwest ISO planning looks at historical binding constraints as part of the annual Midwest transmission expansion planning (MTEP) report. For example, in the MTEP 2009 process, section 8 (market efficiency analysis) is devoted to analysis of historical congestion, a top congested flowgate study, and project-specific evaluations to mitigate top constraints. Refer to the Congestion Management section for additional details or a detailed report can be found at www.midwestiso.org.

Improving market efficiency

Through collaborative effort via the Midwest ISO stakeholder process, the Midwest ISO is always seeking ways to improve overall market efficiency. One of the recent initiatives is a new dispatchable intermittent resource that is expected to allow improved constraint control, reduced manual resource curtailments, greater market transparency, and improved price signals to intermittent resources.

Demand Response Availability

While the Midwest ISO has not experienced the need to deploy Load Modifying Resources (LMR) in an emergency (such as via Emergency Operating Procedures [EOP-002]) and thus does not have a record of LMR performance since the launch of the new Resource Adequacy construct in 2009. The Midwest ISO is currently working with stakeholders and industry organizations such as NAESB to finalize and put into practice testing, measurement and verification (M&V) standards for Demand Response. The measurement and verification procedures developed by the Midwest ISO shall take into account any applicable state regulatory, RE, or other non-jurisdictional entities requirements regarding duration, frequency and notification processes for the candidate Demand Resources.

Midwest ISO Demand Response Future Enhancements

The Midwest ISO is pursuing many improvements to evolve demand response resource participation in the region. These enhancements include:

- Extended Locational Marginal Pricing (“E-LMP”) - The development of a new methodology for determining energy prices will allow, among other market benefits, demand response resources to be able to set the market price when called upon to reduce demand.
• Price Responsive Demand ("PRD") - The Midwest ISO is currently working to develop, with stakeholder participation, appropriate methods to allow for PRD in its real-time energy markets. Already able to participate in the day-ahead markets, PRD's inclusion in real-time markets could significantly impact the amount of other reserves required to reliably operate the system.

• Aggregators of Retail Customers ("ARCs") - In a filing before the FERC, the Midwest ISO has requested the ability to allow for the aggregation of demand response resources. Internal systems are already in-place for this new service, once the FERC makes its ruling.

• "Batch-load" demand response - Large-scale industrial processes are sometimes forced to interrupt their use of electricity for very brief time spans (less than 10 minutes). These industrial processes normally use large amounts of electricity and are able to reduce their use (from normal levels) for several hours at a time, but have been reluctant to register their resources because of measurement and verification ("M&V") issues related to the brief interruptions that could significantly impact the calculation of the benefit of such reduction. The Midwest ISO is currently investigating the clarification of the M&V that would enable the economically efficient incorporation of these demand response resources.

• Demand Response Availability Data System ("DADS") - The Midwest ISO is working to incorporate DADS into the formal reliability processes, similar to the way in which GADS works for generation resources.

• Demand Response / Energy Efficiency ("DR/EE") - The Midwest ISO is working to include DR/EE in the long-term planning process (MTEP). A major independent study has been conducted to project DR/EE across the Midwest ISO footprint at a detailed and local level. The inclusion of DR/EE could have significant effects upon transmission and generation requirements in long-term planning.

• Phase II NAESB Standards - The Midwest ISO is working to incorporate the developing Phase II NAESB standards for demand response M&V into its business practices.

• Load Modifying Resources ("LMR") deliverability - The deliverability of LMR may have long-term implications for reserves, as potential LMR providers weigh the benefits and restrictions of providing LMR services to the wholesale market.

• Barriers to Demand Response - The Midwest ISO continues to seek ways in which to reduce and eliminate barriers to demand response participation in all of its markets. Barriers to demand response take a variety of forms, often related to the historical precedence of generation. That is to say, current wholesale markets are based on the primacy of generation, with rules and procedures that were designed to fit generation resources. Demand resources are often required to meet requirements that, were it not for generation, would be less onerous. Examples include:
  
  o Definitions of contractual relationships between ARCS, LSEs, and EDCs
  
  o Definitions of physical/economic withholding, as it applies to ARCs
- Metering and forecasting standards and requirements
- Energy market issues involving DA and RT requirements for reserve offers
- Inability of demand response resources (DRR) to control the amount of its offer in E&AS markets
- Modeling restrictions related to generation construction schedules

- DRR Tool - The efficient use of demand response resources requires a support system that enables participants and administrators to input, track, and report on those resources. The DRR Tool, developed by the Midwest ISO specifically for demand response, provides a state-of-the-art, web-enabled system to accomplish both basic and advanced tasks including registration, double-counting avoidance, automatic reporting and alert features, and measurement and verification reports. Initially implemented this year, the DRR Tool was designed to tackle the more difficult challenges that will be faced when the FERC ultimately rules on ARCs.

- DRR Spin Services - Widespread agreement is being reached that the most efficient (and economic) use of demand response resources lies in the provision of reserve services. The Midwest ISO has consistently pursued the goal of allowing DRRs to participate in any and all markets based not on a programmatic approach – susceptible to prevailing political winds – but rather based on the physical capabilities of the resources. Market design and existing software capabilities often combine to discourage or prohibit DRRs from participation in reserve markets despite their physical ability to provide such services. The Midwest ISO was able to add spinning reserve service to those available to DRR during 2009, albeit with a 10% cap on the total MW allowed. And although that 10% value has not been binding to this point, the Midwest ISO looks forward to relaxing the cap in the near future.
In the Midwest ISO region, installed generation capacity is approximately 50% coal, 30% gas, 10% nuclear, 10% renewables. However, based on production costs in the region, security-constrained economic dispatch actually results in energy being produced approximately 75% from coal, 15% from nuclear, and 10% from other sources. Wind production is the fastest growing segment of energy production in the region growing from approximately 0.5% in 2005 to 3% in 2009.
Renewable Resources

Midwest ISO Renewable Megawatt Hours as a Percentage of Total Energy 2005-2009(1)

(1) Renewables exclude hydroelectric capacity.

The Midwest ISO’s renewable energy produced as a percentage of total energy rose from 0.5% in 2005 to 3.1% in 2009. In 2009, there were 1,141 curtailments of wind that were backed down due to local congestion issues. This included the curtailment of an estimated 291,674 MWh of energy and spanned over 8,005 duration hours.

Midwest ISO Hydroelectric Megawatt Hours as a Percentage of Total Energy 2005-2009(1)

(1) Hydroelectric energy includes pumped storage.

Hydroelectric’s contribution to total energy remained relatively steady at 1% from 2005 to 2009.
The Midwest ISO’s renewable energy capacity as a percentage of total capacity rose from 0.97% in 2005 to 5.50% in 2009. The average annual capacity factor of those wind units from 2005 to 2009 ranged from a low of 23.6% in 2007 to a high of 31.3% in 2009.

Hydroelectric’s contribution to total capacity remained relatively steady at 4%-5% from 2005 to 2009.
C. Midwest ISO Organizational Effectiveness

Midwest ISO Annual Actual Costs as a Percentage of Budgeted Costs 2005-2009

The Midwest ISO forecasting process is designed as an integrated portion of the overall Corporate Planning Process. Operational planning and forecasting occur simultaneously and continuously in coordination with the quarterly business review process. These activities occur quarterly and look forward over the next six quarters.

The plans and forecasts are discussed during the Quarterly Business Review (QBR). The QBRs are two day senior management retreats to discuss business results and plans including planned vs. actual operating results, budget/forecast vs. actual financial performance, and their forward looking six-quarter rolling operation plan and associated forecast. The expected outcome of each QBR is a corporate plan and forecast that has been discussed and accepted by senior management. This corporate plan and forecast then guides the company forward.

Quarterly, the six-quarter rolling forecast from the QBR is presented to the Audit and Finance Committee of the Board. In establishing the budget for each calendar year, the Committee considers the last four quarters of the rolling forecast submitted to them at the August meeting as the preliminary budget for the following year. At the November meeting, the Committee will consider next calendar year’s portion of the six-quarter rolling forecast as management’s recommendation for budget for the following year and consider that budget for approval. The Board of Directors also reviews budget and forecast variances at each board meeting.

Stakeholder involvement is also a part of the budget and planning process. Stakeholder input is sought on the strategic plan as well as the annual budget. The Finance Subcommittee of the Advisory Committee (“FSC”) reviews and provides comments to the Advisory Committee. Review of the budget with the FSC begins in August and periodic meetings are held until the FSC provides its report to the Advisory Committee and the Audit and Finance Committee.
Committee of the Board of Directors. The Audit and Finance Committee of the Board of Directors reviews management's recommended budget in November and provides its feedback.

Management then submits its final recommended budget to the Audit and Finance Committee in December. After conducting a review of the proposed budget, the Audit and Finance Committee then recommends a budget to the full Board of Directors at the December Board meeting.

Base operating costs, net of miscellaneous income, for the Midwest ISO were under budget from 2005 to 2007 as a result of two primary drivers. In each year, the Midwest ISO was consistently below budget on headcount related costs (salaries and benefits) and computer maintenance driven from the start up nature of the organization. Over the same time period, the Midwest ISO was over budget on miscellaneous revenue, which is used to offset Operating Costs.

The Midwest ISO’s capital investment expenses associated with financing and recovery of capital costs include interest expense, as well as depreciation and amortization expense. The under budget variance in 2005 was driven by the delay in the Energy Market start date, relative to the planned start date. The budget reflects a full year of depreciation and amortization costs, while actual expenses began on April 15th. The variances within capital investment expenses relative to budget from 2006 to 2009 are a function of interest expense. The increase in interest expense relative to budget in 2006 and 2007 is directly related to the amount of collateral held pursuant to the Credit Policy in the Tariff following the start of market operations in April 2005. The dollar volume of transactions subject to the credit policy requirements increased from approximately $100 million per year prior to energy market operations to over $40 billion per year post-market start. The increase in dollar volume settled led to an increase in cash collateral required from Transmission Customers. While the budget anticipated most of the impact of the energy market start, it did not anticipate the entire impact. The decline in interest expense, relative to budget, in 2008 and 2009 is partially related to changes in market rules that accelerated the payment of market charges as well as the significant decrease in interest earned on funds held as collateral.
The administrative costs per MWhr of load served data in the chart above should be reviewed in the context of the widely-varying levels of annual load served by each ISO/RTO as noted in the table below.

<table>
<thead>
<tr>
<th>ISO/RTO</th>
<th>2009 Annual Load Served (in terawatt hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest ISO</td>
<td>513</td>
</tr>
</tbody>
</table>

Prospectively, the Midwest ISO forecasts its annual administration rates will approximate $0.373, $0.335 and $0.315 per MWh of load in 2011, 2012 and 2013, respectively. These administration rates reflect the ending of amortization of startup costs associated with the energy market. In addition, load reductions due to demand response have an immaterial effect on annual administration rates. The projected cost per MWh varies with the amount of load served.
The Midwest ISO's current survey asks 116 questions on a wide variety of subjects ranging from transmission planning to market operations to control room operations. An average score from a subset of that question set, covering key business areas, is used to determine the Midwest ISO's overall customer satisfaction rating. The metric shown above reflects a percentage of respondents' answers that rated 5 or better on a 7 point scale. The respondents to the survey include transmission owners, market participants, regulators, and other Midwest ISO stakeholders. The survey is administered by an independent firm.

The Midwest ISO utilizes the results of its Annual Customer Survey to enhance products and services, and respond to key customer themes that are identified within the survey’s results.

Business area representatives have addressed our stakeholders in robust discussions surrounding Midwest ISO processes, procedures and constraints related to the Annual Survey results. Additionally, enhancements to internal practices have resulted from the feedback received via the Annual Survey mechanism.
**Billing Controls**

<table>
<thead>
<tr>
<th>ISO/RTO</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midwest ISO</td>
<td>Qualification for One Control Objective in SAS 70 Type 2 Audit</td>
<td>Unqualified SAS 70 Type 2 Audit Opinion</td>
<td>Qualification for One Control Objective in SAS 70 Type 2 Audit</td>
<td>Unqualified SAS 70 Type 2 Audit Opinion</td>
<td>Unqualified SAS 70 Type 2 Audit Opinion</td>
</tr>
</tbody>
</table>

In 2005, a single information system control objective was qualified. In 2007, two control objectives were qualified, one related to transmission settlement charges for curtailment of transactions and one related to the process for managing changes to information systems.

The Midwest ISO focuses on the accuracy of both prices posted and amounts billed to ensure members can rely on prices for transacting and have confidence in the amounts included in their Midwest ISO invoices.

- From the start of the market on April 1, 2005 to December 31, 2009, the Midwest ISO had three Market Implementation Errors (MIE). The average dollar impact of these MIEs was $461.

- For 2009, the Midwest ISO made 16 adjustments as a result of settlement errors. The total net amount adjusted for 2009 was -$173,715.
D. Midwest ISO Specific Initiatives

As the Midwest ISO views its contributions to the region, our commitment to operational excellence is evidenced by its continued effort to develop and refine our own Value Proposition metrics. The Midwest ISO has collaborated with its stakeholders since implementing its energy market in 2005 to create and enhance this meaningful and effective set of tools to measure the value that the Midwest ISO provides. The Value Proposition metrics, which are available to the public on the Midwest ISO website, are updated regularly to provide feedback on the effectiveness of Midwest ISO operations.

The Value Proposition breaks the Midwest ISO business model into certain recognized categories of benefits to the footprint as a whole and calculates a range of dollar values for each defined category. The benefits studied are: reliability, energy dispatch, unloaded capacity, regulation, spinning reserves, diversity of resources in the footprint, generator availability, and two categories of demand response (dynamic pricing and interruptibles). After accounting for the load reductions driven by the economic downturn, our 2009 Value Proposition demonstrates between $700 and $900 million in annual net economic benefits to our region. These benefits are illustrated and described below:
Quantitative Benefits

A. Improved Reliability - $263 to $394 million in annual benefits
The Midwest ISO’s broad regional view and state-of-the-art reliability tool set enables improved reliability for the region as measured by transmission system availability.

B. Dispatch of Energy - $210 to $264 million
The Midwest ISO’s real-time and day-ahead energy markets use security constrained unit commitment and centralized economic dispatch to optimize the use of all resources within the region based on bids and offers by market participants.

C. Unloaded Capacity - $199 to $213 million
With the start of the Ancillary Services Market and the functional consolidation of the region’s Balancing Authorities, responsibility to respond to operating issues was consolidated in the Midwest ISO eliminating the need for multiple Balancing Authorities to hold unloaded capacity.

D. Regulation - $184 to $194 million
With the start of the Midwest ISO Regulation Market, the amount of regulation required within the Midwest ISO footprint has dropped significantly. This is the outcome of the region moving to a centralized common footprint regulation target rather than a number of non-coordinated regulation targets within the footprint.

E. Spinning Reserves - $76 to $81 million
Starting with the formation of the Contingency Reserve Sharing Group and continuing with the implementation of the Spinning Reserves Market, the total spinning reserve requirement has been reduced freeing low-cost capacity to meet energy requirements.

F. Midwest ISO Cost Structure - $248 million in annual costs
Administrative costs are expected to remain relatively flat into the future.

G. Footprint Diversity - $217 to $272 million
Midwest ISO’s large footprint increases the load diversity factor allowing for a decrease in regional planning reserve margins from 15.40% to 12.69%. This decrease delays the need to construct new capacity.

H. Generator Availability Improvement - $249 to $311 million
The Midwest ISO’s wholesale power market has resulted in power plant availability improvements of 3.1% delaying the need to construct new capacity.

I. Dynamic Pricing - $4 to $7 million
The Midwest ISO enables dynamic pricing which provides customers with a rate signal that reflects the higher cost of providing electricity during peak times than off-peak times. Dynamic pricing allows additional generation investment deferral.
J. Direct Load Control and Interruptible Contracts - $58 to $72 million

The Midwest ISO enables direct load control and interruptible contracts which provide load serving entities the ability to curtail load. This allows the load serving entities to defer generation investment by lowering demand.

**Qualitative Benefits**

In addition to the quantitative benefits the Midwest ISO has demonstrated as part of its Value Proposition, there are also significant qualitative benefits that wholesale market participants derive from the existence and operation of the Midwest ISO, including:

1. Price transparency
2. Planning coordination
3. Regulatory compliance
4. Wholesale platform for integrating renewables