

ISO MMIP Appendix 1**DATA REQUIREMENTS FOR MARKET MONITORING**
(Initial Sample List)A. Data Derived Directly from Administration of PX and ISO Markets

- ~~hourly Zonal Market Clearing Prices in the Energy, Ancillary Services and Imbalance Energy markets;~~
- ~~Supply Bids (prices and quantities) submitted by all Market Participants to the PX and ISO with respect to the markets they administer;~~
- ~~Supply Bids withdrawals and redeclarations during bidding cycles;~~
- ~~winning Supply Bids identified by the ISO and PX in each of the markets they administer;~~
- ~~winning Supply Bids not selected by the ISO if Congestion is present and not remedied by rebidding;~~
- ~~Revised Schedules, if any, selected by the ISO where Congestion is present and is remedied by Adjustment Bids (Congestion Management)~~
- ~~characteristics of and available data on Generation Units and transmission facilities active in the ISO and PX administered markets, including availability variations within billing cycles;~~
- ~~recurrence, frequency, timing, and causes of Constraints leading to Congestion;~~
- ~~recurrence, frequency, timing, and causes of Constraints leading to ISO's call on Reliability Must Run Units;~~
- ~~market shares of different Market Participants in the ISO and PX administered markets and of Generation Units over relevant time frames and under different conditions; e.g. Congestion, seasonal availability of hydropower, etc.;~~
- ~~historical data on Generation Units and transmission facility costs (including incremental costs), to the extent considered useful in monitoring the ISO and PX administered markets;~~

- ~~historical data on Generation Units and transmission facility availability, Forced outages and Scheduled Maintenance, to the extent considered useful in monitoring the ISO and PX administered markets;~~
- ~~current cost data insofar as available or provided by Market Participants (e.g., IOU commitments to provide variable cost data in the pre divestiture period); and~~
- ~~data on factors that may lead to "vulnerable periods" in the markets administered by the ISO and PX, including periods of Congestion, seasonal and periodic low hydropower output, high demand, seasonal and periodic low out of state imports, and facility Outages, both forced and planned.~~

B. Data Derived from Sources Partly or Wholly External to the Markets Administered by the ISO and PX

- ~~publicly available data on historical Generation Unit and transmission facility costs, including the marginal generating costs of different Generating Units and types of Generating Units (classified by technology, fuel type, age, etc.) including unit by unit heat rates, fuel costs, etc.;~~
- ~~current Generation Unit cost indices, such as fuel prices and other input prices;~~
- ~~data on hourly Schedules submitted by Scheduling Coordinators, including injection points, Generation sources, and Delivery Points;~~
- ~~hourly information on reliance by the ISO on call contracts for Reliability Must Run Units, including, where pertinent, cost data, bidding data, and price and quantity data;~~
- ~~information on whether access to information by different types of Market Participants may affect their ability to game the markets administered by the ISO and PX or to gain unfair competitive advantage over other Market Participants.~~
- ~~market prices of relevant out of state Energy markets;~~
- ~~information from other open Energy trading markets, including prices and quantity for Energy and Ancillary Services; and~~
- ~~Information on bilateral trades from trade publications and surveys;~~

ISO MMIP Appendix 2**MARKET INDICES, INDICATORS AND ANALYTICAL TOOLS
FOR MARKET MONITORING**
(Initial Sample List)

In addition to an adequate database, a key component in an effective market monitoring program will be the development of an analytical framework and capability for effectively monitoring the series of interrelated markets administered by the ISO and PX. These markets have a number of new and unique features as to which many of the traditional tools for market power monitoring, such as cost data and, in some cases, price information, may not be available.

As a starting point in developing this framework and capability, the ISO Market Surveillance Unit has developed, and will continue to expand, elaborate upon and refine, a series of indices or indicators which may suggest the presence of market power or its exercise or of other behavior that may undermine the efficient working of these markets. These indices or indicators will at a minimum serve as a warning sign to trigger further inquiry as to whether there is in the circumstances a problem that requires corrective action. Hence, the indices or indicators proposed below will not, in most cases, serve as definitive tests of the existence of or the exercise of market power, or of behavior that undermines the market's efficient functioning, but will rather serve as means of identifying circumstances which justify further inquiry or action.

Some of the monitoring indices or indicators may not be available at the start of ISO and PX operations. The following is an initial sample list of indices that may be used initially or over time. These may be refined, and others may be developed, on the basis of experience in administering the markets. Some will be phased in over time depending on data availability and market experiences.

A. Market Clearing Price Indices

- (1) The percentage of Settlement Periods in which a Market Participant has set, or has submitted bids close to, the Market Clearing Price in the Energy and Ancillary Service markets overall, and in relation to the following time periods or market conditions:
 - a) when such Market Participant is:
 - i. a net buyer of Energy and Ancillary Services;
 - ii. a net seller of Energy and Ancillary Services;
 - b) during on-peak hours and off-peak hours;
 - c) in different time periods otherwise of relevance to the state of the markets;

~~For each of these situations, bids submitted when Congestion is present and those when there is no Congestion will be compared. These indices will also be examined in relationship to other "vulnerable periods" and bidding strategies;~~

- ~~(2) the relationships between the Market Clearing Prices in the various markets administered by the ISO and PX, e.g., between the Imbalance Energy market and the Energy and Ancillary Services markets;~~
- ~~(3) the record of Market Participants setting Market Clearing Prices in the context of the inter market relationships as described in (2);~~
- ~~(4) The percentage of Settlement Periods in which a Market Participant has set, or has submitted bids close to, the Market Clearing Price when such price falls into a particular segments of the market price curve, e.g., \$20-30/MWh, and \$30/MWh and above;~~
- ~~(5) A "price mark up" check that measures the differences in Market Clearing Prices between unconstrained periods and constrained periods.~~

B. Comparison and Evaluation of Specific Bidding Strategies of Market Participants

- ~~(6) Correlation between bidding behavior of Market Participants and their establishing the Market Clearing Price at times when they are:
 - i. net buyers of Energy and Ancillary Services,
 - ii. net sellers of Energy and Ancillary Services;~~
- ~~(7) bidding and rebidding strategies of Market Participants, especially those that frequently set Market Clearing Prices during iterations in the bidding cycles of each market, both within and between the markets administered by the ISO and PX;~~
- ~~(8) comparison of bidding strategies for the same Generation Unit into Day Ahead Market, Hour Ahead Market and Imbalance Energy markets;~~
- ~~(9) comparison of bidding strategies for the same Generation unit into the Energy, Ancillary Service and Imbalance Energy markets;~~
- ~~(10) comparison of Supply Bids of Generation units with similar technology/age characteristics;~~
- ~~(11) Supply Bid and Generation Unit withdrawals and redeclarations during bidding cycles;~~

- ~~(12) correlation of changes to initial Supply Bids with Market Clearing Prices, e.g., to ascertain if redeclarations cause or lead to increases in such prices;~~
- ~~(13) comparison of bidding strategies for the same Generation Unit in relation to the following time periods or market conditions:~~
- ~~a) when the Market Participant that owns the unit is a net seller or a net buyer of Energy or Ancillary Services;~~
 - ~~b) when congestion is or is not present;~~
 - ~~c) when a Reliability Must Run Unit is called or not called;~~
 - ~~d) when "near Congestion" occur. "Near Congestion" means the final scheduled power flow over an Inter Zonal Interface is within a few percentage of the Available Transmission Capacity, or when congestion would occur with the initial Preferred Schedules but alleviated after rebidding;~~
- ~~(14) comparison of bidding strategies of Market Participants in relation to their market share;~~
- ~~(15) relationships or correlations between the ability of Market Participants to set Market Clearing Prices or certain type of bidding behavior and periods or circumstances in which such Market Participants may have exclusive or restrictive access to data, e.g., as to costs or availability of Reliability Must-Run Units, or as to expected or actual outages of Generation Units or transmission facilities;~~

C. Indices of Market Concentration

- ~~(16) In addition to the conventional HHI analysis, the ISO Market Surveillance Unit will also use dynamic, geographic and product market specific HHI's that are based on actual market operation data as one of the many indicators of the competitive condition of the ISO and PX markets. HHI's will be developed for:~~
- ~~i. each of the geographic markets or Zones;~~
 - ~~ii. each of the PX and ISO product markets including Energy, Ancillary Services and Imbalance Energy markets;~~
 - ~~iii. each of the Day Ahead, Hour Ahead and Real Time Markets;~~
 - ~~iv. each of the market conditions such as on peak and off peak periods, periods with Congestion and without Congestion, and periods with and without other constraints;~~
- ~~(17) HHI's with other modifications such as whether the resource is biddable, and whether the market has excess capacity.~~

D. Outages and Other Indices

- (18) ~~Generation Unit and transmission facility Outage indices in comparison with historical averages, with other similar units or facilities, and with other relevant standards;~~
- (19) ~~New or unexpected occurrences of Congestion; and~~
- (20) ~~Trend comparisons of Market Clearing Prices with fuel prices and other input prices.~~