

# **California ISO White Paper**

## **Market Redesign and Technology Update (MRTU)**

### **Proposal for Metered Subsystems**

**November 19, 2004**

## **Preface**

In the July 22, 2003 Amended Comprehensive Market Redesign Proposal ("Proposal"), the ISO proposed the treatment of Metered Subsystems ("MSS") from a conceptual standpoint and the attached white paper further develops the concepts proposed in Section 2.8 of that Proposal.

A MSS is a geographically contiguous system located within a single Zone which has been operating as an electric utility for a number of years prior to the ISO Operations Date as a municipal utility, water district, irrigation district, State agency or Federal power administration subsumed within the ISO Control Area and encompassed by ISO certified revenue quality meters at each interface point with the ISO Controlled Grid and ISO certified revenue quality meters on all Generating Units or, if aggregated, each individual resource and Participating Load internal to the system, which is operated in accordance with a MSS Agreement. A MSS Operator is the entity that owns the MSS and has executed a MSS Agreement.

The MSS Agreement incorporates a number of principles as guidelines for future changes to the agreement and the ISO Tariff as follows:

- **Cost Causation:** ISO charges will be charged to the Scheduling Coordinator based on the principle of cost causation, with due regard for historic considerations, timing and transition issues, and other relevant factors.
- **Load Following Capability:** A MSS may elect to follow its own Loads with its own resources and make economic resource decisions with the resources in its portfolio.
- **Compatibility of Market Participants:** For the efficient use of transmission and to decrease Congestion the ISO desires that all Scheduling Coordinators, including the SC for the MSS Operator, operate using similar rules and Scheduling timelines.

In addition, the MSS Agreement recognizes that the ISO is in the process of redesigning the ISO markets and that the ISO will use the principles in the agreement along with an amendment process outlined in the agreement to amend the MSS Agreement once the components and the impacts of the market redesign are known.

## **PROPOSAL FOR METERED SUBSYSTEMS TREATMENT IN MRTU**

If not specifically addressed in this paper, then the standard market rules will apply to the MSS similar to any other similarly situated Market Participant.

### **1. BACKGROUND**

The ISO has been working with the existing Metered Subsystems ("MSS") on implementation of Phase 1b of the ISO's Market Redesign and Technology Upgrade ("MRTU"). While everyone agrees that there are favorable benefits of the MSS structure, improvements are being sought in conjunction with the implementation of MRTU after Phase 1b. This paper is not intended to, and does not, address MRTU Phase 1b issues, however, the ISO will work with the MSS Operators to revise the design once Phase 1b is implemented.

The following is a discussion of options and opportunities for MSS when the ISO implements MRTU. MRTU includes Congestion Revenue Rights ("CRR"), the Integrated Forward Market ("IFM"), Residual Unit Commitment ("RUC"), Full Network Model ("FNM"), Real-time Market ("RTM"), and Settlements and Market Clearing ("SaMC"). This paper is intended to be a collaborative evolutionary process with the MSS Operators that attempts to address the design issues from "front-to-back", through each of the components of the market redesign.

To better implement the redesign, three initial decisions must be made for each MSS Agreement.<sup>1</sup> They are:

1. Will the SC for the MSS Operator follow its own Load?
2. Does the SC for the MSS Operator select gross CRRs and gross settlements, or net CRRs and net settlements?
3. Will the MSS Operator opt in or opt out of RUC?<sup>2</sup>

The ISO believes that these decisions are not independent, but inter-related. As an example if the MSS Operator were to choose the Load following option, it would likely use their Generating Unit capacity for load following and therefore would opt out of the

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<sup>1</sup> If one or more MSS Operators whose MSS are subject to a MSS Aggregator Agreement want to make the three decisions separately, then a new MSS Agreement must be executed to incorporate those MSS. The reasoning behind this requirement is the need to distinguish both scheduling and settlement options that will also impact compliance and monitoring issues. The need for this split is discussed further below.

<sup>2</sup> RUC opt in or opt out means that the ISO will (opt in) or will not (opt out) in the RUC process i) consider any shortfall between the MSS Operator's final Day-Ahead Schedule and the ISO's Load forecast for that MSS in setting the Day-Ahead RUC procurement target, and ii) procure RUC capacity to cover that shortfall. With respect to MSS supply resources, RUC opt out relieves the SC for the MSS Operator of any obligation to offer its resources in the Day-Ahead IFM and RUC processes, but does not preclude them from participating on a voluntary basis.

RUC process. In this case, the MSS Operator would receive settlements based on the use of the ISO Controlled Grid (i.e. net settlement). In addition, these decisions are consistent because when the MSS Operator makes commitment and dispatch decisions regarding Load following, those decisions are not necessarily consistent with the economic dispatch done by the ISO.<sup>3</sup> Therefore, the cost of the Load following dispatch should not be included in the price of the Load Aggregation Point (“LAP”).

On the other hand, if the MSS Operator were not to choose the Load following option, it may participate in the ISO's RUC process and receive gross Energy settlements because in this case, in general, the MSS does not have internal Generating Units to follow its internal Load. Therefore, the issue of RUC participating on behalf of the MSS seems to be contingent upon the availability of the MSS resources and therefore could go either way. Another key issue in the election process is that if the MSS Operator elects net settlement, then CRRs would be allocated on the MSS' net Load whereas if the MSS Operator elects gross settlement, then CRRs would be allocated on a gross Load basis. The potential options, therefore, seem to be:

<u>Load Following</u>	<u>RUC Participation</u>	<u>CRR Allocation &amp; Energy Settlement</u>
No	No	Gross
No	No	Net
No	Yes	Gross
Yes	N/A <sup>4</sup>	Net

A MSS Operator may make an annual election of the three decisions discussed above and direct its SC to implement such decisions. The election will be coincident with, or just prior to it, the annual CRR allocation process for the monthly CRRs to allow the alignment of CRR allocation with the implementation of the chosen Energy settlement option. A single SC ID must be used for each set of decisions (i.e. load following, net treatment, and RUC opt out; no load following, gross treatment and RUC opt in; etc.) this is the only way the ISO can be assured of the correct operating treatment and settlements for each MSS. The ISO continues to require one SC per meter in order to avoid the implementation of administrative rules for allocating uninstructed deviations in the settlements process.

## **2. ASSUMPTIONS**

The following assumptions apply in the modeling of the MSS within the ISO Control Area for both the ISO Controlled Grid and the non-ISO Controlled Grid operation in the IFM/RUC/RTM:

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<sup>3</sup> The ISO and SVP are having discussions to further the understanding of this logic and changes, if agreed, may impact various sections of this paper.

<sup>4</sup> As discussed above, if the SC for the MSS Operator is Load following, then RUC is implicit as the opt out option and therefore is not applicable for the options table.

1. The network of the MSS (generation and Load points), ISO Controlled Grid facilities and all non-ISO Controlled Grid facilities (including embedded Control Areas) will be modeled in detail in the FNM. This allows the ISO to correctly forecast in the forward market the actual operation of the Control Area and external ISO Controlled Grid facilities in real-time.
2. A MSS will continue to be defined as an electrically contiguous system that is directly or indirectly connected to the ISO Controlled Grid subject to a MSS Agreement with the ISO or be incorporated in a MSS Aggregator Agreement and applicable sections of the ISO Tariff.
3. A MSS is responsible for the Congestion internal to its electrically contiguous system, consistent with the MSS Agreement.
4. MSS Operators may form a MSS aggregation subject to a MSS Aggregator Agreement with the ISO. A MSS aggregation is the sum of two or more MSS. A MSS may be a member of a single MSS aggregation only; it cannot be a member of two MSS aggregations. A MSS aggregation may also include resources external to the member MSS, but each such external resource may be member of only one/the same MSS aggregation (i.e. Collierville as an external resource to the NCPA aggregation can not also be an external resource to the San Diego aggregation, if there were one).<sup>5</sup>
5. To allow the correct distribution of Energy from the Generating Units to the MSS Load, Load Zones and Load Distribution Factors (“LDFs”) shall be defined for each MSS for scheduling purposes in the FNM.<sup>6</sup> A MSS aggregation will have a specific Load Zone however each MSS within the MSS aggregation will have a specific LDF. The Load Zones for a single MSS (not part of a MSS aggregation) and the Load Zone of a MSS aggregation shall be separate from each other and not part of other wider load aggregations for scheduling in the FNM. This restriction is only applicable to the scheduling process and not to settlements. For Energy settlements, the MSS and MSS aggregation will be based on the LAP and assessed the LAP Price either on a net or gross Load and export basis. While the ISO is concerned that due to the different basis on which the MSS is scheduled and then settled there might be a potential for gaming that may result in strategic false scheduling, the ISO hopes to work with the MSS Operators to develop rules to stem these concerns.
6. The ISO needs Demand Forecasts and Generating Unit/inter-tie Schedules for the FNM to work properly. Thus the SC will provide Demand Forecasts and Generating Unit/inter-tie Schedules for the MSS to the ISO for the MSS Operator; otherwise the ISO shall assume default Generation and Load patterns from representative power flow cases. For the purpose of splitting a System Unit into each unit for the FNM, a Generating Unit priority list or distribution factors for the

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<sup>5</sup> An external resource is a MSS Operator's resource that is outside its electrically contiguous system (i.e. Collierville and Geysers are external resources for the NCPA MSS Aggregation).

<sup>6</sup> A Load Zone is similar to a Demand Zone. The terms are being changed to distinguish the two market designs.

MSS Generation (i.e. internal Generation) shall be provided to the ISO by the SC for the MSS Operator, otherwise the ISO shall assume default values based on representative power flow cases.

7. Based on the data provided by the SC for the MSS, the ISO will produce a Demand Forecast for each MSS and MSS aggregation at the Load takeout point. This is similar to the existing requirement in the ISO's Demand Forecasting Protocol.
8. Consistent with Section 11 of the MSS Agreement or MSS Aggregator Agreement, the SC for the MSS will Schedule gross Generation, imports, exports and Load with the ISO in the IFM, consistent with the higher of the ISO or MSS forecast.<sup>7</sup> The MSS gross Load will be scheduled in the respective single MSS or MSS aggregation Load Zone.
9. The MSS Operator shall make annual elections relative to the option for Load following, RUC participation, CRR and Energy settlements for an annual period consistent with long-term CRRs, and subject to ISO approval. Satisfactory performance, and penalties for non-compliance will apply, as discussed in each respective section of this paper. The elections of each component will be the same for all MSS that are members of a MSS aggregation.
10. MSS Operators that elect Load following shall be responsible for meeting MSS Demand plus losses in real-time by dispatching MSS Generating Units or external resources that are part of the relevant MSS aggregation. The Load following shall be performed at the MSS aggregation level by its SC. The MSS Operator that elects Load following and does not follow Load within the bandwidth will be penalized as discussed below.
11. Network constraints (i.e. circuit ratings, thermal ratings, etc.) in the MSS or at the MSS boundaries shall be monitored, but not enforced in the ISO's FNM used for Scheduling or selecting bids in the forward markets.

If overloads are observed in the forward markets that are internal to the MSS or at the MSS boundaries and are attributable to MSS operations, the ISO shall communicate such events to the SC for the MSS and coordinate any manual re-dispatch required in real-time. If the SC for the MSS is unable to resolve Congestion internal to the MSS or at the MSS boundaries in real-time, independent of the ISO, the ISO will use out-of-sequence ("OOS") instructions on resources that have been bid into the market, hence it will not directly affect the Locational Marginal Price ("LMP") of Generating Units.<sup>8</sup>

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<sup>7</sup> It would be preferable to have just one forecast that the ISO and the MSS Operator or MSS aggregator agree upon. If this is achieved, then the discussion regarding the differences in forecasts is moot. Absent such agreement, then the distinctions addressed in this paper would be implemented.

<sup>8</sup> The advantages of treating congestion relief for the MSS Load following as OOS instructions include: (i) this is an existing feature in the RTM; (ii) there is an automatic tracking and Energy calculation; (iii) use of OOS instructions will insulate the LMP paid by other SCs from the MSS Congestion cost; (iv) OOS Energy is settled at the OOS-specific price; (v) OOS Energy is not part of Bid Cost Recovery.

Congestion relief for Congestion external to the MSS will be done in accordance with the ISO Tariff, including using in-sequence and OOS bids.

The ISO and MSS Operator need to develop specific procedures for each MSS to determine how network constraints will be handled. The ISO will work with the MSS Operator to develop an operating procedure to resolve network constraints.

12. It is currently proposed that transmission losses in the MSS whose MSS Operator elects Load following will be ignored in LMP calculations.<sup>9</sup>
13. MSS Operators shall annually elect the option for RUC exclusion for a yearly period consistent with long-term CRRs. The RUC exclusion option shall be the same for all MSSs that are members of a MSS Aggregation. MSSs may elect RUC exclusion without Load following. MSS Operators that elect the RUC exclusion option (i.e. to not participate in RUC) will "self-schedule" the gross Load that corresponds to the relevant MSS Demand forecast in the Day-Ahead and Hour-Ahead IFM, and shall be exempt from RUC cost allocation.<sup>10</sup> The MSS Operator that self-schedules Load equal to the ISO's Load forecast for the MSS shall be exempt from any RUC cost allocation and penalties if the ISO's Load forecast is inaccurate. Otherwise, if the MSS Operator uses its own Demand forecast that is lower than the ISO's, the MSS Operator shall accrue penalty points for Load under-scheduling. The number of penalty points would increase with the amount of Load under-scheduling. Accumulating a specified number of penalty points over a consecutive 12-month period may void the RUC option for the remaining portion of the current annual term and the next annual term. The RUC proposal is discussed more fully below.
14. The MSS Operator that elects Load following the SC for that MSS Operator will indicate in the Schedule the Generating capacity reserved for MSS Load following and the Generating Unit priority list and/or distribution factors for MSS Generating Units that will be providing the service (MSS internal or part of a MSS aggregation) to the ISO. The priority list and distribution factors may be updated on an hourly basis. The SC for the MSS Operator that elects Load following will also electronically communicate to the ISO in real-time its updated Load following plan (forecast) for the next 2 hours, and the Load Following instructions issued to the relevant MSS Generating Units every five (5) minutes. The ISO shall use the Load Following instructions for MSS Generating Units in RTM to simulate the MSS Load following. The ISO will include the Load Following instructions in the

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<sup>9</sup> Transmission losses can be ignored by zeroing resistance in the respective network areas, or preferably by neglecting transmission loss factor contributions from these network areas in the market applications without altering network parameters.

<sup>10</sup> The first tier costs are allocated to under-scheduled Load in the forward markets and the second tier costs are allocated to the MSS net-metered Demand. Net metered Demand in this instance means sum of all Metered Quantities as measured at each MSS bubble's City Gate. Further is the ISO moves to a Simplified Hour-Ahead market where there is no explicit Load Scheduling, then the entire gross Load would need to be scheduled in the Day-Ahead market.

dispatch instructions issued to MSS Generating Units. The dispatch instructions thus determined by the ISO will be used as a reference to compute uninstructed deviations (i.e. final Hour-Ahead schedule plus subsequent instructions, including load following, versus metered Demand).

15. The distribution factors and/or priorities will be used in the ISO's Load forecast for the forward markets to simulate Load Following in the Market Power Mitigation (pre-IFM) runs and in the RUC process. The Load following instructions provided by the SC for the MSS Operator at 5-minute intervals will be used to simulate Load Following in Real-Time Market ("RTM").
16. MSS resources may self-provide or bid Ancillary Services and may participate in the IFM, RUC, or RTM, irrespective of the decision to Load follow or participate in RUC.
17. The MSS resources will be Scheduled and dispatched in the IFM, RUC, and RTM consistent with the elections made by the MSS for Load following and RUC participation, and consistent with submitted priority lists, distribution factors, bids, and Load Following instructions as applicable. Schedules and Dispatch Instructions will be resource-specific.
18. Dispatch Instructions shall identify the product being dispatched and include both MSS Load following instructions from Generating Unit capacity reserved for that purpose and market instructions from submitted bids in RTM. The ISO will rescind capacity payments for Ancillary Service bids ("No Pay") that are not available to the ISO in real-time on a resource-specific basis. Uninstructed deviation penalties for a MSS or MSS aggregation that is not Load following shall be assessed at the single MSS or MSS aggregation level as the case may be. For a Load following MSS or MSS aggregation, the Deviation Penalty shall be assessed in accordance with the MSS Agreement.
19. For MSS Operators that have a gross Energy settlement, MSS gross Generation will be settled at the respective Generating Unit LMPs. MSS gross Load shall be included in the default LAP price calculation and shall be settled at the corresponding LAP price.
20. For MSS Operators that have a net Energy settlement, MSS net Generation (i.e. the extent to which Generation exceeds Load inside each MSS) shall be settled at a weighted average of the respective MSS Generating Unit LMPs (i.e. each MSS Generating Unit will have a LMP and the LMP for the MSS will be the weighted average of all internal Generating Units on a 10 minute basis). The MSS net Load (i.e. the extent to which Load exceeds Generation inside each MSS) shall be included in the default LAP price calculation (with the MSS Load Zone Price) for the Zone in which the MSS is located (i.e. NCPA will be included in the PG&E LAP) and shall be settled at the corresponding LAP price.

### **3. CONGESTION REVENUE RIGHTS ("CRRs")**

The issues regarding CRRs are being determined in the CRR process, and not separately determined in this MSS process.



#### **4. SCHEDULING/BIDDING**

MSS resources may participate in the IFM by submitting a 3-part bid and/or self-scheduling. Energy bids are subject to Market Power Mitigation. Ancillary Services may be self-provided or bid in the IFM. Scheduling must be on a Generating Unit specific basis. Resources and Loads may bid or self-scheduled.<sup>11</sup> If resources or Load are bid, then all market rules and settlements apply. The ISO proposes to establish a Load Zone for each MSS to facilitate settlements. The appropriate Load Zone would be used in Scheduling.

An MSS Operator that elects to participate in RUC should submit a 1-part Energy bid and/or self-schedule. An MSS Operator that elects to not participate in RUC should self-schedule 100% of the Load forecasted for the MSS. For an MSS that elects Load following, the MSS Operator should also self-schedule or bid equal supply.

Load Following: If the SC for the MSS is Load following then the SC for the MSS will include in its Day-Ahead Schedule the Generating Unit(s) that are Load following; the range of the Generating Unit(s) being reserved for Load following; whether the quantity of Load following capacity is either up or down; and if there are multiple Generating Units in the MSS, the priority list or distribution factors among the Generating Units. These characteristics may be changed in the Hour-Ahead Market. Generating Unit(s) providing Load following will be flagged. This information will be used in the forward markets (pre-IFM runs and the RUC, but not the IFM) to simulate MSS Load following.

#### **5. INTEGRATED FORWARD MARKET ("IFM")**

Congestion Management is a concern. Congestion and the impact of both Congestion within the MSS on the ISO's operations, and Congestion in other portions of the ISO Control Area on the MSS need to be evaluated to allow for operating procedures to be developed that resolve Congestion issues. In the IFM, constraints will not be enforced in each MSS. Costs associated with internal Congestion and losses in the MSS will be the responsibility of the MSS Operator.

#### **6. RESIDUAL UNIT COMMITMENT ("RUC")**

If a MSS Operator or a MSS aggregation is Load following, the RUC is not applicable because such MSS is already providing for its respective Load including following it in real-time. Moreover, penalties are already incorporated in the Load following requirement in the MSS Agreement -- the Deviation Penalty.<sup>12</sup>

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<sup>11</sup> However, if the MSS opts out of RUC participation, all Loads must be self-scheduled and cannot be bid in the IFM.

<sup>12</sup> The Deviation Penalty requires that the Load following MSS must be within 3% of the lesser of the metered or Hour-Ahead scheduled Demand and exports for the MSS. If the MSS has over-generated above this band, then the Generation is sold to the ISO with no compensation. If the MSS has under-generated then the MSS purchases Energy from the ISO at the LAP price and in addition pays a penalty valued at two times the price of the Energy purchased.

MSS resources may participate in the RUC irrespective of the election of the MSS RUC participation. To participate in the RUC, the SC for the MSS Operator is required to bid in the IFM. The bids provide RUC availability and may be subject to Market Power Mitigation. Awarded RUC capacity must be bid for dispatch in real-time. Minimum Load resources committed in the Day-Ahead RUC should be self-scheduled in the Hour-Ahead IFM. If a MSS Operator that opts out of RUC, then its Generating Units are exempt from the "must-offer" obligation, but the SC for the MSS may submit RUC bids at their sole discretion.<sup>13</sup> If the MSS Operator opts in or decides to participate in RUC, then its Generating Units are eligible for the RUC availability payment. Regardless of whether the MSS Operator opts in or opts out, the SC for the MSS Operator may self-provide Ancillary Services ("A/S"), or bid A/S subject to the same validation rules that apply to all A/S self-provision and A/S bids.

Opt In: MSS Operators that elect to participate in the RUC process will be treated the same as any other Scheduling Coordinator with respect to RUC.

Opt Out: In the case where the MSS Operator elects the RUC exclusion option, the ISO will not commit resources in RUC to serve the MSS Load. The SC for the MSS will have two options (please note, in either option MSS resources can still submit RUC availability bids and receive a RUC availability payment if a MSS resource is committed in RUC to provide reliability capacity for the ISO grid outside the MSS).

1. If the SC uses the ISO forecast of MSS Load, then the SC will be exempt from penalties provided the SC schedules the hourly Load amount from the ISO forecast in the Day-Ahead Market as a self-schedule (*i.e.* price taker). The SC is not subject to RUC charges, either tier 1 or tier 2.
2. If the SC uses its Load forecast for the MSS Load, then the SC must schedule 100% of the hourly Load amount in the Day-Ahead Market as a self-schedule (*i.e.* price taker). The SC is not subject to RUC tier 1 and tier 2 allocation charges. However, if the MSS Load in the final Day-Ahead Schedule is less than the ISO's forecast and less than the MSS's metered Demand then:
  - a. Penalty points will be calculated based on the following:
    - i. If the difference is more than 2% or 5 MW, but less than 5% or 10 MW, then the SC for the MSS Operator will have one penalty point against it for each occurrence.
    - ii. If the difference is between 5% or 10 MW, and 10% or 20 MW, then the SC for the MSS Operator will have two penalty points against it for each occurrence.
    - iii. If the difference is greater than 10% or 20 MW, then the SC for the MSS Operator will have five penalty points against it for each occurrence.
  - b. A total of more than 20 penalty points, with a maximum accrual of 5 penalty points per day, within 12 consecutive months would require the MSS Operator to opt in to RUC for the remainder of the annual term and for the following annual term and be subject to RUC cost allocations as

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<sup>13</sup> However, if the MSS Operator has Generating Units that have executed a RMR Agreement, then those units must execute a Participating Generator Agreement and be subject to must-offer.

any other Market Participant. If points accrue, the ISO will notify the SC for the MSS Operator and discuss the specific events. The annual term will be coincident with the election process for RUC and aligned with the annual CRR term.

## **7. FULL NETWORK MODEL ("FNM")**

The following approach is proposed for the FNM:

- The FNM will include a full model of MSS transmission networks used for power flow calculations and constraint management in Forward and Real Time markets.
- The IFM will model all transmission constraints on the ISO Controlled Grid and all transmission constraints internal to the MSS. For a MSS Operator that does not elect Load Following, the MSS network constraints will be enforced. For a MSS Operator that elects Load Following, the MSS network constraints will be monitored, but not enforced.
- Locational Marginal Prices ("LMP") are based on dispatch instructions of Generating Units and therefore Generating Unit specific information from the MSS is required.
- If a transmission line connecting the MSS to the ISO were out of service, then the ISO would need to model the line as out of service versus as a zero transfer capability on the transmission line.
- To facilitate accurate scheduling and settlements, each MSS needs to be modeled as a separate Load Zone and all Generating Units are physically modeled in the FNM.
- While FNM includes a complete model of the MSS power system networks, for MSS who elect load following, the effect of MSS transmission losses are excluded from the incremental loss model used to calculate the loss sensitivity factors. The loss sensitivities contribute a term to the calculation of the LMPs that represents the marginal cost of supplying losses at the bus where the LMP is calculated. This way, for MSS who elect load following, the impact of MSS losses is not reflected in LMPs calculated by the Real Time and Forward markets.

## **8. FORECASTING**

While the ISO strongly urges that the parties develop a single forecast to avoid the two forecast issue discussed in this paper, the development of that process has not been discussed or initiated. Absent agreement on a common forecast, the ISO will perform Load forecasting for each MSS or MSS Aggregator. This will facilitate the accurate calculation of the MSS Load Zone requirements and allow better Congestion Management in the forward markets.

Load Following: With the Day Ahead and Hour Ahead data provided by the SC for the MSS regarding the Load following Generating Units and submitted priority lists, distribution factors, and bids, the ISO will have the ability to include, as part of the forward markets, the Load following characteristics.

## **9. HOUR-AHEAD MARKET**

Buy back of A/S is only allowed due to a Forced Outage of a Generating Unit. The SC for the MSS can substitute a Generating Unit with another Generating Unit at the same location that was previously scheduled in the Day-Ahead Market.

## **10. REAL-TIME OPERATION/DISPATCH**

MSS resources may participate in the RTM irrespective of the MSS Load following option. Location of services in a LMP paradigm is critical; thus, while netting of resources in settlement will still be allowed, physical response must be from the specified Generating Unit. ISO dispatch instructions would be the MW instruction on a resource specific basis every five minutes for each product being dispatched (i.e. Dispatchable Load, spin, non-spin, Supplemental Energy, Load following) to serve the ISO, including Load following needs of the SC for the MSS or MSS Aggregator. Dispatch instructions must be accurate and feasible. MSS resources are expected to follow ISO dispatch instructions.

Load Following: During real-time operation for Load following MSS Operators, the ISO needs to ensure feasible dispatches and operational reliability, thus the ISO needs an estimate of the number of MWs the Generating Unit will be generating over the next two hours. This will allow the ISO to address line loading impacts associated with Load following Generating Units in advance of the Operating Hour. This data will be used for informational purposes only and is intended to be an estimate based on the then current information.<sup>14</sup> The MSS Operator will provide the ISO with telemetry of the MSS's response to the Load following instructions. Additionally, for each MSS Load following resource, the MSS Operator will provide the ISO with the expected output for these resources. This data will be provided at 5-minute intervals and will represent the expected output for the upcoming 120 minutes in 5-minute granularity. The ISO will model the Load following based on the characteristics provided by the SC for the MSS.

The State estimator will estimate the Load in real-time, including the MSS Load subject to Load following, and incorporate the information provided by the Load following MSS Operator in its dispatch decisions and instructions.

## **11. SaMC/METERING**

In general, for charge types existing prior to LMP implementation, the settlement principles remain unchanged. That is, to the extent charge types are addressed in the existing MSS agreement or referenced in the ISO Tariff, the settlement methodology will hold true in the LMP markets. New charge types and principles are addressed below:

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<sup>14</sup> It is agreed that the information being provided is the best available information at the time it was provided. Additionally, it is agreed that System Emergencies or extraordinary events (i.e. losing a MSS) may not be foreseen and could substantially impact the information that was provided. In the instance of an extraordinary event or System Emergency, the MSS will immediately notify the ISO and not wait for the 5-minute interval.

*Ancillary Service Settlements:*

Consistent with the existing MSS Agreement terms, to the extent a MSS resource is bid into the A/S markets, payments for Ancillary Service capacity are made in accordance with the ISO Tariff. Cost allocations for Ancillary Service capacity payments (regardless of whether a MSS resource participates in the AS Market) are also settled in accordance with the ISO Tariff. New charge types for Forward Market Ancillary Service allocations for neutrality will exist in MRTU and be applied to the SC for the MSS consistent with application to other SCs; these charge types are similar to today's Rational Buyer Adjustment (CT 1011), however, a neutrality Charge Type will exist for each Ancillary Service type. The neutrality adjustments will be charges or payments based on Metered Demand, allocating the difference between dollars paid/charged for total Day Ahead Ancillary Service procurement vs. the dollars that would have been paid/charged for actual requirements (based on metered quantities if the ISO over-procured in the Day Ahead Market). If the ISO under-procures, there is no neutrality allocation. Real-time A/S allocations will be applied to the SC for the MSS consistent with application to other SCs.

*Forward Market Settlements*

If a MSS is settled on a net basis, and is a net Generator, then the MSS will be settled at the weighted average of the locational prices of the MSS Generating Units. If the MSS is a net Load, then the MSS will be settled at the applicable LAP price. If the MSS is settled on a gross basis, then the Generating Unit of the MSS will be settled at its LMP and the Load will be settled at the Default Load Aggregation Price.

*Real Time Market Settlements*

If a MSS is settled on a net basis, specific charge types for Real Time will be settled accordingly, as net<sup>15</sup>. If a MSS is settled on a gross basis, then Instructed Energy is deemed delivered and paid at the resource-specific LMP and consistent with Phase 1b, the MSS will be settled on a resource specific basis for Uninstructed Imbalance Energy for each 10-minute increment.

*MSS Deviation Penalties and Uninstructed Deviation Penalties*

Consistent with the current compliance/settlement implementation, the ISO will pay the SC for the MSS 100% of the LMP for positive deviation quantities within the tolerance band and will accept the Energy but not pay the SC for the MSS for Energy outside the positive deviation quantity. For negative deviation quantities outside of the tolerance band the SC for the MSS is penalized 200% of the LMP; this is in addition to the LMP payment for the Energy purchased. If the MSS Operator is Load following, and does not follow ISO instructions the existing principles for Deviation Penalties will apply for deviation quantities outside of the tolerance band; however the price for the MSS portfolio will be a MSS specific real-time ex-post LMP derived from the real-time ex-Post LMP. The MSS specific real-time ex-post LMP will be calculated as Uninstructed Imbalance Energy weighted average price for all MSS resources in the portfolio.

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<sup>15</sup> The details associated with implementation and calculation methodologies for net Real Time Settlement and the impacted charge types require further discussion.

If the MSS Operator is not Load following, the existing principles for Uninstructed Deviation Penalties for all other Market Participants will apply as specified in the ISO Tariff.

Attached for consideration is a Settlement Charge Matrix.

## **12. COMPLIANCE**

If the SC for the MSS bids Ancillary Services, the bids will be on a unit-specific basis. Ancillary Services that are bid and accepted, but are not available as bid on a unit specific basis are subject to No Pay.

A MSS Operator that elects Load following will need to identify the specific Generating Units that are following Load and reserve the capacity for Load following in the forward markets. Load following instructions issued by the MSS Operator will be sent to the ISO and included in the real-time market systems. The reserved Load following capacity will be taken into account in the No Pay calculations.

Deviation Penalties rather than Uninstructed Deviation Penalties will be applied in aggregate at the boundaries of the MSS or MSS Aggregation that has elected Load Following. Uninstructed Deviation Penalties will apply to any resource not identified to be part of a Load following MSS or a Load following MSS aggregation.

Load forecasting penalties for the SC for a MSS will be the same as for other SCs.

## **13. MARKET MONITORING**

Regardless of MSS Operator annual selection options, the MSS Operator must provide information requested by the ISO market monitor to ensure no strategic bidding and/or scheduling by the MSS Operator.

## **14. RESOURCE ADEQUACY**

The ISO will be working with all MSS Operators to determine the appropriate criteria and procedures for the Resource Adequacy Requirement.