UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

California Independent System Operator Corporation	**)**	**Docket No. ER11-4580-000**

ANSWER TO MOTIONS TO INTERVENE AND COMMENTS, MOTION TO FILE ANSWER, AND ANSWER TO PROTESTS, OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION

The California Independent System Operator Corporation ("ISO")[1] hereby files its answer to the motions to intervene and comments submitted in this proceeding in response to the ISO's submittal on September 21, 2011, of an amendment to the ISO tariff to eliminate convergence bidding at the interties.[2] The ISO also hereby submits a motion to file an answer and its answer to the protests submitted in this proceeding by DC Energy, FIEG, Financial Marketers, NRG Companies, and WPTF.[3]

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[1] The ISO is also sometimes referred to as the CAISO. Capitalized terms not otherwise defined herein have the meanings set forth in Appendix A to the ISO tariff. Unless otherwise expressly stated, references in this filing to the "tariff amendment" are references to the tariff amendment submitted in the instant proceeding (Docket No. ER11-4580).

[2] The following entities filed motions to intervene and/or comments in this proceeding: Brookfield Energy Marketing LP; California Department of Water Resources State Water Project ("SWP"); Cities of Anaheim, Azusa, Banning, Colton, Pasadena, and Riverside, California (collectively, "Six Cities"); City of Santa Clara, California and the M-S-R Public Power Agency; DC Energy California, LLC ("DC Energy"); Dynegy Moss Landing, LLC, Dynegy Morro Bay, LLC, Dynegy Oakland, LLC, and Dynegy Marketing and Trade, LLC; Financial Institutions Energy Group ("FIEG"); Gila River Power LLC; J.P.; Macquarie Energy LLC; Morgan Ventures Energy Corporation and BE CA LLC; Modesto Irrigation District; Northern California Power Agency ("NCPA"); NRG Power Marketing LLC, Cabrillo Power I LLC, Cabrillo Power II LLC, El Segundo Power, LLC, Long Beach Generation LLC, and NRG Solar Blythe LLC (collectively, "NRG Companies"); Pacific Gas and Electric Company ("PG&E"); Powerex Corp. ("Powerex"); Sacramento Municipal Utility District; SESCO Enterprises LLC, West Oaks Energy, LLC, and XO Energy CAL, LP (collectively, "Financial Marketers"); Southern California Edison Company ("SCE"); and Western Power Trading Forum ("WPTF").

[3] The ISO submits this answer pursuant to Rules 212 and 213 of the Commission's Rules of Practice and Procedure, 18 C.F.R. §§ 385.212, 385.213. The ISO requests waiver of Rule 213(a)(2), 18 C.F.R. § 385.213(a)(2), to permit it to make an answer to the above-listed protests.

A number of commenters in this proceeding express their strong support for the ISO's tariff amendment,[4] while primarily marketers and financial trading entities, and a small number of power generators, protested the filing. For the reasons explained below, the Commission should accept the tariff amendment as submitted.

I. Executive Summary

The Commission has long recognized that allowing market participants to submit virtual bids provides benefits to the efficiency of competitive wholesale electricity markets like the ISO markets. The primary benefit is the convergence of prices between the day-ahead and real-time markets. The ISO fully supports the benefits of a properly working convergence bidding market feature and has no plans to modify convergence bidding within the ISO balancing authority area (*i.e.*, internal convergence bidding).

As the ISO has explained, however, faced with the lack of convergence between the day-ahead and real-time prices there is a need to specifically address whether permitting virtual bids at the interties in the current ISO market design is just and reasonable. The prevalence of hourly transmission schedules in the areas of the Western interconnection which neighbor the ISO balancing authority area required the ISO to design its nodal markets to provide for the

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Good cause for this waiver exists here because the answer will aid the Commission in understanding the issues in the proceeding, provide additional information to assist the Commission in the decision-making process, and help to ensure a complete and accurate record in the case. *See, e.g.*, *Xcel Energy Services, Inc.*, 124 FERC ¶ 61,011, P 20 (2008); *California Independent System Operator Corp.*, 132 FERC ¶ 61,023, P 16 (2010); *Equitrans, L.P.*, 134 FERC ¶ 61,250, P 6 (2011).

[4] CDWR at 1; NCPA at 3; PG&E at 3-4; Powerex at 1; SCE at 3; Six Cities at 2.

hourly settlement of interties through the hour-ahead scheduling process while maintaining a separate and distinct five-minute settlement for internal resources. Implementing convergence bidding at the interties under this "two-settlement" market structure produces a number of challenges and market inefficiencies unique to California. No other independent system operator or regional transmission organization allows virtual bidding at interties which settle based on separate hour-ahead prices rather than the real-time market prices.

The ISO adopted more stringent position limits on the interties to allow the ISO and market participants sufficient opportunity to deal with any consequences that may arise by permitting convergence bidding at the interties. Actual market experience has proven that convergence bidding at the interties is causing adverse impacts on the market through an increase in market uplifts (associated with a ISO account called the real-time imbalance energy offset) and the distortion of market prices and incentives. In addition, the ISO has observed that the two software constraints needed to allow for convergence bidding at the interties periodically is causing market clearing prices at the interties to be inconsistent with the bid prices offered by a physical exporter or importer. The ISO is now proposing modifications to its convergence bidding rules to address these adverse market outcomes.

Real-time imbalance energy offset charges have more than doubled since convergence bidding was implemented in the ISO markets in February 2011. Although price convergence has improved in recent months, the uplifts associated with offsetting virtual bids at the interties still cost the market over $3

million a month. Such uplifts have the potential to increase during the winter and spring months, when divergence between hour-ahead and real-time prices has often tended to increase due to seasonal market conditions. While commenters argue that these costs are insignificant and should be ignored as they are trending downwards in most recent months, the fact is that these are significant costs imposed on ISO market participants without any benefits to the efficiency of the ISO markets whatsoever. Simply put, convergence bidding at the interties is not contributing to, and under certain circumstances is undermining, the primary objective of promoting convergence between day-ahead and real-time prices. The ISO recognizes that convergence bidding at the interties gives a number of financial traders the opportunity to take positions at internal nodes and interties that can potentially provide the financial traders with attractive financial gains. However, the fundamental issue put forth before the Commission in this proceeding is whether the ISO should continue to allow this opportunity for financial gain when there are no identifiable market efficiencies being provided by such activity and when the costs associated with that activity are entirely borne by market participants that do not cause them and that are representatives of actual load with no means of protecting themselves against such costs.

After a review of the experience to date with convergence bidding at the interties and a consideration of the alternatives, the ISO and numerous market participants have concluded that the ISO must address the adverse impacts on the ISO markets resulting from convergence bidding on the interties. Not surprisingly, the ISO's filing to remove convergence bidding at the interties is

supported by a number of load-serving entities and physical suppliers and a smaller group of commenters – primarily representing the interests of financial traders in the ISO markets – seek to retain the market inefficiencies resulting from intertie convergence bidding. These commenters offer no basis for the Commission to reject the ISO's reasoned and well-supported decision to remove convergence bidding at the interties.

Some commenters also inappropriately request that the Commission only address the issue of increased market uplifts resulting from offsetting virtual bids taken by the same scheduling coordinator. As explained below, however, the profit incentives to individual market participants engaged in convergence bidding at the interties result in substantial market inefficiencies even if the offsetting bids are not submitted by the same entity or through the coordinated effort of two or more entities. Therefore, the proposals of some commenters to ban specific scheduling practices will provide little if any relief from the adverse impacts observed in the ISO markets.

Commenters opposing the ISO's filing suggest that convergence bidding at the interties provides various market efficiency benefits. Most of the "benefits" cited by these commenters are vaguely defined and not supported by actual evidence. Contrary to the commenters' assertions, the ISO considered all of the purported benefits of convergence bidding at the interties in the stakeholder process preceding the ISO's filing and concluded that significant benefits either did not exist or could be achieved through other means that remain available once convergence bidding at the interties is eliminated. For example, after

discussions with market participants, the ISO and its Department of Market Monitoring concluded that convergence bidding at the interties is not needed to facilitate the importing of renewables or other variable resources over the interties. Notably, no trade association or other party representing the interests of importers of renewable power opposed the ISO's filing.

These commenters even suggest that eliminating convergence bidding at the interties could increase day-ahead prices. If that were even close to a likely outcome of the ISO's filing, the load-serving entities that ultimately must pay day-ahead prices surely would have opposed the tariff amendment. Instead, all the load-serving entities support the ISO's filing.

Some commenters note that the ISO's filing does not address all of the underlying concerns with the two-settlement market structure in real-time. The ISO agrees that its existing hour-ahead scheduling process design requires further consideration and has therefore established an ongoing stakeholder process to consider both intermediate and long-term solutions to these issues. A very large percentage of the real-time imbalance energy offset costs associated with the two-settlement market structure, however, is the direct result of convergence bidding at the interties, and there is no reason not to address this market inefficiency now while the ISO and its stakeholders consider both intermediate and long-term steps.

In sum, for the reasons explained in the ISO's tariff amendment and in this answer, the ISO has concluded that elimination of convergence bidding will address significant market inefficiencies and result in charges to market

participants that are just and reasonable. The Commission should accept the ISO's filing and reject the arguments of those commenters that seek to retain inefficiencies that harm the ISO markets.

II. Answer

A. Eliminating Convergence Bidding at the Interties is Appropriate Based on a Consideration of the Costs and Benefits

Some commenters argue that it is not just and reasonable to eliminate convergence bidding at the interties because the ISO has failed to sufficiently justify doing so based on consideration of the costs and benefits.[5] These commenters are incorrect. The ISO implemented convergence bidding at both internal nodes and the interties with the expectation that its markets would experience the benefits of convergence bidding experienced by other independent system operators and regional transmission organizations as noted by the Commission in its orders authorizing convergence bidding in the ISO markets. The ISO's experience with convergence bidding at locations within the ISO balancing authority area has largely met those expectations. However, as explained in the tariff amendment[6] and below in this answer, the ISO has determined that convergence bidding at the interties has caused adverse market impacts without providing the intended benefit of price convergence or any other

[5] FIEG at 7; Financial Marketers at 4-5, 18-21; NRG Companies at 4-5; WPTF at 5-7, 20-21. The terms "convergence" and "virtual" are used interchangeably in this filing: "virtual" emphasizes the non-physical nature of the bids, while "convergence" highlights one of the primary expected benefits of this market feature – convergence of day-ahead and real-time prices.

[6] Transmittal letter for tariff amendment at 13-16.

benefit. The ISO's determination that convergence bidding at the interties should be eliminated was also supported by both the ISO's Market Surveillance Committee ("MSC") and its Department of Market Monitoring ("DMM").[7] Therefore, based on a consideration of the costs and benefits, the ISO determined that eliminating convergence bidding at the interties is just and reasonable.[8] The ISO provides further discussion of the costs and benefits below.

1. Convergence Bidding at the Interties Does Not Promote the Convergence of Day-Ahead and Real-Time Prices

The Commission has explained that a primary purpose of convergence bidding is to cause day-ahead and real-time prices to converge. In its September 2006 order directing the ISO to implement convergence bidding, the Commission explained that "[c]onvergence bidding reduces the price differences between the real-time and the day-ahead markets, thus reducing the incentive for buyers or sellers to forego bidding physical schedules in day-ahead markets in expectation of better prices in the real-time markets."[9] The Commission reiterated this primary purpose of convergence bidding in its order authorizing the ISO to

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[7] Attachment D to tariff amendment, MSC Final Opinion on Intertie Convergence Bidding and the Imbalance Energy Offset at 1 ("We support the CAISO proposal to eliminate convergence bids at interties.") ("MSC Final Opinion"); Attachment E to tariff amendment, DMM Quarterly Report on Market Issues and Performance at 34 ("DMM is supportive of the ISO's proposal to eliminate virtual bidding at the inter-ties as a short-term option for reducing real-time energy imbalance costs.") ("DMM Quarterly Report").

[8] *See, e.g.*, transmittal letter for tariff amendment at 3 ("The stakeholder process also confirmed that the issues created by convergence bidding at the interties are not offset by the benefits that convergence bidding was supposed to have brought to the ISO markets."); *id.* at 14 (As the DMM explains, while convergence bidding has added significantly to real-time imbalance energy costs, convergence bidding has had little or no benefit in terms of improving price convergence or the efficiency of day-ahead unit commitment decisions.").

[9] *California Independent System Operator Corp.*, 116 FERC ¶ 61,274, at P 450 (2006).

implement convergence bidding at the interties and at locations within the ISO.[10] Thus, the Commission authorized both of those types of convergence bidding with the expectation that they would improve convergence between day-ahead and real-time prices.[11]

The ISO demonstrated in the tariff amendment that convergence bidding at the interties is not causing day-ahead and real-time prices to converge. Instead, during the initial implementation of convergence bidding, prices in the day-ahead tend to be lower than prices in the five-minute real-time dispatch, and prices in the hour-ahead scheduling process tend to be lower than both day-ahead and real-time dispatch prices.[12] During this period, the ISO often observed a net virtual supply position due to virtual supply bids at the interties that have exceeded the net internal virtual demand bids for the same time period. Such a result does not make economic sense during periods when real-time prices exceed day-ahead prices but for the additional profits some market participants could earn through the hour-ahead bidding practices described in the ISO's tariff amendment. Moreover, as Mr. Rothleder has explained, the virtual supply bids in this circumstance actually impede convergence by offsetting the

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[10] *California Independent System Operator Corp.*, 130 FERC ¶ 61,122, at PP 30, 35 (2010).

[11] WPTF potentially confuses matters when it argues that convergence bidding at the interties was designed to promote convergence between day-ahead prices and hour-ahead scheduling process prices, but that "[n]othing about the convergence bidding design was designed to converge day-ahead and real-time prices at the interties, nor was it intended to converge HASP [hour-ahead scheduling process] prices and real-time prices." WPTF at 5, 14. As explained in the testimony of Mark A. Rothleder provided in the tariff amendment, divergence of hour-ahead and real-time prices creates the incentive for the costly bidding practices the ISO seeks to address in this filing regardless of any convergence between day-ahead and hour-ahead prices. Attachment C to tariff amendment, Direct Testimony of Mark A. Rothleder, at 10-11 ("Rothleder testimony").

[12] Transmittal letter for tariff amendment at 10-11, 13-15; Rothleder testimony at 6-14.

internal demand bids that would otherwise tend to produce convergence between the day-ahead and real-time markets.[13] In most recent months, there has been an increase in price convergence between the day-ahead and real-time prices. However, as discussed further below, this increase is associated with seasonal and operational factors that have resulted in improved alignment in the ISO's forecast of demand with regard to actual operations. During this time, offsetting schedules of convergence bids on the interties – whether submitted by the same scheduling coordinator or submitted separately by different scheduling coordinators – have continued to contribute to real-time imbalance energy offset costs for specific hours in which prices between the day-ahead and real-time continue to diverge. Thus, convergence bidding at the interties has not contributed to the decrease in the real-time imbalance energy offset costs. Rather, the real-time imbalance energy offset costs have decreased as price convergence has improved.

The price convergence improvement over the last few months coincides with a reduction in positive price volatility in the five-minute real-time market. This reduction in price volatility can be attributed to improved operational conditions and practices. In particular, the amount of ramping capability increased in August and September as high hydroelectric power supply conditions relaxed and loads increased, and additional thermal capacity with additional ramping capacity was committed. Further, improvements in hour-ahead forecasting and operating practices resulted in more consistent conditions

[13] Rothleder testimony at 10-14.

between the hour-ahead and real-time dispatch processes. To the extent that operational conditions change and become more challenging in the future, the observed improvement in price convergence could reverse. If this were to occur, there would be greater potential for offsetting convergence bid volumes and real-time imbalance energy offset charge costs to increase.

2. Convergence Bidding at the Interties Imposes Costs on Market Participants through Increased Real-Time Imbalance Energy Offset Costs

While convergence bidding at the interties has not promoted or contributed to day-ahead/real-time price convergence, it has directly caused increases in the amount of real-time imbalance energy offset costs. In particular, real-time imbalance energy costs have increased because it has been consistently profitable for market participants – individually and collectively – to submit virtual bids for supply at interties that are offset by virtual demand bids at locations within the ISO.[14] Since convergence bidding was implemented in February 2011, total real-time imbalance energy offset costs have more than doubled due to this offsetting of virtual supply and demand bids – during that time the costs due to offsetting of virtual bids have amounted to $53 million, while the

[14] Pursuant to the ISO's two-settlement market design, a virtual bid for supply at an intertie is paid the difference between the day-ahead (*i.e.*, integrated forward market) price and the hour-ahead scheduling process price, while a virtual bid for demand at an internal ISO location is paid the difference between the day-ahead price and the real-time dispatch price. When a virtual bid for supply and a virtual bid for demand offset each other, the resulting net payment is the difference between the hour-ahead scheduling process price and the real-time dispatch price. Thus, whenever the real-time dispatch price is higher than the hour-ahead scheduling process price, as it frequently is in the ISO markets, this offsetting of virtual bids will be profitable for market participants. These profits are funded solely by real-time imbalance energy offset costs. MSC Final Opinion at 4-5.

real-time imbalance energy offset costs due to other causes have amounted to $47.6 million.[15]

Financial Marketers and WPTF argue that the cost impact on real-time imbalance energy offset costs caused by convergence bidding at the interties has recently diminished, and thus that elimination of convergence bidding at the interties is not appropriate.[16] These commenters mistakenly assume that recent reductions in real-time imbalance energy offset costs are certain to be permanent. In fact, as explained in a recent DMM memorandum attached to this answer, trends in divergence in hour-ahead real-time prices have tended to be seasonal – with divergence often increasing in the winter and spring months.[17] These seasonal trends in price divergence make it impossible to conclude that the drop in real-time imbalance energy offset costs in the most recent summer months will continue. Instead, the seasonal trends create the clear potential that these costs will increase in the future should convergence bidding on the interties continue. In addition, the recent improvements in price convergence are largely attributable to seasonal conditions and software and operational enhancements implemented by the ISO.[18] Further, even in the recent months that Financial Marketers and WPTF reference, the real-time imbalance energy offset costs

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[15] Transmittal letter for tariff amendment at 13-14; Rothleder testimony at 14-16, 20-22.

[16] Financial Marketers at 7; WPTF at 19-20.

[17] Memorandum from Eric Hildebrandt, Director of DMM, to ISO Board of Governors, at 6-7 (Oct. 20, 2011) ("October 20 DMM Memorandum"). The October 20 DMM Memorandum is provided as Attachment A to this answer and is available on the ISO website at http://www.caiso.com/Documents/111027Department_MarketMonitoringReport-Memo.pdf.

[18] *Id.* at 6.

amounted to millions of dollars. The October 20 DMM Memorandum shows that offsetting convergence bids contributed an average of about $3.3 million per month to those charges in August and September of 2011.[19] Where no significant benefits from convergence bidding at the interties have been shown, it is appropriate to eliminate convergence bidding at the interties in order to eliminate these significant costs.

There is also no merit to the claim of Financial Marketers that, for May and July of 2011, offsetting virtual bids at the interties resulted in a credit to the real-time imbalance energy offset account.[20] The two slides in the ISO presentation that Financial Marketers cite to support their claim (slides 10 and 12) show the 30-day rolling average of the contribution of offsetting convergence bids to real-time imbalance energy offset costs. As shown in both of those slides, the 30-day average of the net value of all offsetting virtual bids was positive (indicating that these bids increased real-time imbalance energy offset costs) during all days except for a two-week period in May. Moreover, as shown in slide 12, these data were based on a simplified approach that only considered the difference in the system marginal energy cost.[21] This simplified approach did not include actual prices after factoring in congestion and losses on which virtual bids are settled. Mr. Rothleder's testimony submitted in support of the tariff amendment provides a more detailed analysis of the impact of these offsetting bids based on the

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19 *Id.* at 6-7.

20 *See* Financial Marketers at 7 & fn.8.

21 ISO Presentation, Market Performance and Planning Forum, at slides 10, 12 (Aug. 3, 2011). This presentation is available on the ISO website at http://www.caiso.com/Documents/Agenda-MarketPerformance-PlanningForum_Aug_3_2011.pdf.

actual locational marginal prices upon which offsetting virtual bids were settled (including congestion and losses). The results of that analysis show that the effect of all offsetting virtual bids (as well as those placed only by the same scheduling coordinator) was to significantly increase offset charges during all months.[22]

When real-time prices spike in the negative ranges, the offsetting bidding practices can provide some relief to the real-time imbalance energy offset. But such relief is rare and insufficient to offset the more frequent and financially damaging impact of real-time price spikes in the positive ranges. Under certain day-ahead and real-time pricing conditions, market participants (*e.g.*, traders) can be subject to charges associated with their holdings which results in credits to the real-time imbalance energy offset. For example, if a market participant assumes that prices in the hour-ahead scheduling process are going to be less than day-ahead prices which are also less than real-time prices, which is frequently the case, the participant will have an incentive to submit virtual supply bids at the interties and to submit offsetting virtual demand bids within the ISO because such bids will be profitable when real-time prices spike above the bid cap ($1,000 per MWh). On the other hand, if prices fall below the bid floor (negative $30 per MWh), such trades will turn out to be unprofitable.[23] The asymmetry between the bid cap of $1,000 per MWh and the bid floor of negative $30 per MWh results in more extreme positive price spikes when upward

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[22] Rothleder testimony at 22 (Figure 6).

[23] *See* ISO tariff, Sections 39.6.1.1 and 39.6.1.4 (setting forth the bid cap and bid floor).

ramping capability is scarce that are not offset by negative price spikes when downward ramping capability is scarce.[24] This asymmetry means that market participants that offset virtual bids are much more likely to turn a profit than to incur a loss. And such profits are funded solely by real-time imbalance energy offset costs paid by load serving entities.

3. All Offsetting Virtual Bids at the Interties Result in Market Inefficiencies and Increased Costs

Financial Marketers argue that the ISO should not consider offsetting of virtual supply and demand bids at the interties submitted by different market participants in its evaluation of the need for elimination of convergence bidding at the interties. Financial Marketers assert that only offsetting of virtual bids by the same market participant is relevant to the analysis.[25] That assertion is erroneous. Mr. Rothleder explained in his testimony that regardless of whether the offsetting of virtual bids is by the same market participant or by different market participants, and regardless of whether the offsetting of virtual bids occurs due to a deliberate bidding strategy or inadvertently, the result is the same – the virtual bids at the intertie offset each other and thus increase the real-time imbalance energy offset costs without any resulting benefit to the market in the form of day-ahead/real-time price convergence.[26] As described in Mr.

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[24] *See* Rothleder testimony at 9-10.

[25] Financial Marketers at 6-7.

[26] Rothleder testimony at 16 (explaining that prohibiting the deliberate offsetting of virtual bids would not be effective in part because "offsetting virtual supply and demand bids by the same market participant only account for a portion of all offsetting bids"). Thus, Financial Marketers are mistaken in asserting that the deliberate offsetting of virtual bids by the same market participant is the sole reason stated by the ISO for eliminating convergence bidding at the

Rothleder's testimony, offsetting virtual bids between different market participants have accounted for over one-third of all real-time imbalance energy offset costs that are due to offsetting virtual bids.[27] Thus, offsetting of virtual bids between different market participants is a significant cause of such charges.

The increase in real-time imbalance energy offset costs resulting from convergence bidding at the interties is particularly troublesome due to how those charges are allocated under the ISO tariff. They are allocated to scheduling coordinators based on a pro rata share of their measured demand (*i.e.*, metered load and exports). Because load-serving entities are the only type of scheduling coordinators with metered ISO demand, they bear the vast majority of these costs. In contrast, the parties that actually impose these additional costs on the market are completely protected from any uplift costs they create.[28] Thus, it is not surprising that the only entities opposing elimination of convergence bidding at the interties are entities that can financially benefit from offsetting of virtual bids (coordinated or otherwise) without being allocated any of the resulting real-time imbalance energy offset costs.

As Mr. Rothleder explained, eliminating convergence bidding at the interties will be beneficial for the ISO market. The market will likely experience

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interties. *See* Financial Marketers at 5. Commenters' suggestions to prohibit the deliberate offsetting of virtual bids are discussed further in Section II.C, below.

[27] Rothleder testimony at 21-23 (explaining that, of the $53 million in real-time imbalance energy offset costs due to offsetting bids that occurred from February 2011 through August 2011, $34.9 million was the result of offsetting balanced virtual supply and virtual demand positions by the same market participant and $18.1 million was the result of offsetting balanced virtual supply and virtual demand positions by different market participants).

[28] Transmittal letter for tariff amendment at 14; Rothleder testimony at 24-25.

immediate relief from a reduction in current levels of real-time imbalance energy offset uplift charges. Further, elimination of convergence bidding at the interties may actually allow internal convergence bidding to achieve increased convergence between day-ahead and real-time prices because it will eliminate the offsetting virtual supply bids that have produced net virtual supply in periods when economic circumstances would dictate that a net demand position should exist.[29] The production of these benefits justifies elimination of convergence bidding at the interties.

4. Commenters Have Not Demonstrated the Purported Benefits of Convergence Bidding at the Interties

In contrast to the extensive evidence and testimony the ISO provided in the tariff amendment that convergence bidding at the interties is imposing costs without providing significant benefits to the ISO markets, commenters opposing the ISO's filing in this proceeding make only unconvincing and insufficiently supported allegations that intertie convergence bidding provides benefits in California. Indeed, some of the benefits claimed by these commenters are so vague and ill-defined as to be meaningless. For example, FIEG alleges that, with the elimination of convergence bidding at the interties, the ISO "is exposing its market participants to largely avoidable price risks, counter party risk, reliability issues, and a flawed market design."[30] However, nowhere in its protest does FIEG provide any explanation of these terms and allegations. Financial Marketers likewise argue that there is "substantial evidence" that convergence

[29] Rothleder testimony at 33-35.

[30] FIEG at 9.

bidding at the interties is "preventing or mitigating the effects of system design flaws,"[31] but go on to provide no explanation or evidence of what these purported flaws are or how convergence bidding at the interties helps to prevent or mitigate them.[32] In light of the evidence and analysis provided by the ISO in this proceeding, the Commission should reject these unsupported claims out of hand.

Other claims by some commenters are more specific but, as discussed below, are nevertheless without merit.

5. Convergence Bidding at the Interties Is Not Producing any Significant Benefits with Regard to Hedging

The Commission has stated that convergence bidding can benefit market participants by providing a mechanism for hedging exposure to real-time prices.[33] The ISO agrees that convergence bidding at locations within the ISO balancing authority area can provide hedging benefits. However, convergence bidding at the ISO's interties is not providing such a benefit to any significant degree with regard to either physical or financial hedging. Physical hedging is not apparent given the pricing separation between the hour-ahead scheduling process and the real-time market. Further, neither load-serving entities nor physical importers – the entities that actually have physical resources or loads to hedge – have asserted in their stakeholder input or in comments in this proceeding that they require such physical hedging on the interties. To the contrary, these entities

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[31] Financial Marketers at 4.

[32] Commenters also argue that allowing convergence bidding at the interties adds more liquidity in the ISO markets. As discussed below, they do not explain what kind of liquidity is added and do not explain what benefits such liquidity provides to the ISO markets overall.

[33] 130 FERC ¶ 61,122, at P 30.

have expressed support for the ISO's proposal, which is itself strong evidence that intertie convergence bidding is not providing a significant physical hedging benefit. As for financial hedging, the ISO does not believe that convergence bidding can be justified based on the purported hedging "benefit" produced by offsetting virtual bids. This practice does not provide the market participants with a hedge against actual risk. Rather, when employed as a bidding strategy, the offsetting of virtual bids is more of a financial strategy that results in likely gains for individual market participants without any corresponding benefit to the market, while the resulting real-time imbalance energy offset costs are allocated to other market participants (the load-serving entities).

WPTF lists a few types of hedging as purported benefits of convergence bidding at the interties.[34] However, WPTF concedes that it appears market participants have not engaged in such hedging with any regularity.[35] WPTF's unsupported claim that the "ability to use convergence bidding for this purpose is valuable even if it is not consistently used for this purpose today,"[36] only begs the question of why market participants would not have consistently used hedging during the eight months that convergence bidding has been in effect. The only reasonable answer is that the types of hedging to which WPTF refers are of, at most, negligible value to market participants.

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[34] WPTF at 6.

[35] *Id.* at 6 fn.7 (stating that the value of hedging to market participants "is likely unrepresented by the extent which participants to date have used convergence bids to hedge their own physical transactions").

[36] *Id.* (emphasis omitted).

WPTF's unsupported claim that convergence bidding at the interties allows "hedging congestion on intertie paths" is puzzling.[37] WPTF provides no explanation of how virtual bids can be used to hedge congestion on the interties, but nevertheless goes on to state that this supposed benefit applies to "the vast amount of energy that is transacted at the ISO intertie points."[38] In fact, the overwhelming bulk of net imports into the ISO are scheduled in the day-ahead market. Congestion related to these import transactions can be hedged using congestion revenue rights ("CRRs"). However, it is unclear how virtual bidding could be used to hedge congestion on interties in the day-ahead market, where most of energy imports are actually transacted.[39]

WPTF also argues that convergence bidding at the interties allows suppliers to "manage price risk that results when they are unexpectedly able to deliver."[40] WPTF fails to note that this purported benefit was discussed in the stakeholder process for the tariff amendment and was addressed in an analysis performed by the DMM. Specifically, the DMM explained that an entity seeking to import generation could theoretically use virtual exports to partially hedge against the price risk the entity may face if it cannot deliver supply scheduled in the day-ahead market as the result of a generation or transmission outage

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37 *See* WPTF at 6.

38 *Id.*

39 It is conceivable that an entity seeking to import power could use virtual bidding on the interties to "switch" the risk of congestion between the day-ahead and hour-ahead markets. However, this would simply be switching the risk from one market to another, not hedging the risk.

40 WPTF at 6.

occurring prior to the hour-ahead market. Under this scenario, the entity would need to reduce its day-ahead schedule in the hour-ahead market and be charged for this reduction at the hour-ahead market price. By scheduling virtual exports in the day-ahead market, the entity could hedge any financial risk that the hour-ahead price paid for such reductions and would be higher than the day-ahead price received for energy scheduled in the day-ahead market. However, the DMM's analysis found almost no evidence of this practice. While day-ahead physical imports average over 7,000 MW per hour, an average of only about 11 MW per hour of virtual demand is scheduled by entities with cleared day-ahead physical imports at the same intertie. Even if all 11 MW per hour were intended to hedge against a potential outage, the total value of the hedge would be *de minimis*, at most, compared to the direct impact of virtual schedules on real-time imbalance energy offset costs.[41]

WPTF contends that the use of convergence bidding to hedge delivery risk of imports is analogous to the risk of forced outage faced by internal generating resources.[42] In practice, however, there are significant differences between how imports and resources within the ISO are scheduled and settled that likely account for the *de minimis* degree to which convergence bids may be used to hedge delivery risk of intertie transactions. First, if a generating unit within the ISO becomes unavailable after being scheduled in the day-ahead

[41] Memorandum from Eric Hildebrandt, Director of DMM, to ISO Board of Governors re: Market Monitoring Report, at 7 & fn. 5 (Aug. 18, 2011) ("August 18 DMM Memorandum"). The August 18 DMM Memorandum is provided as Attachment B to this answer and is available on the ISO website at http://www.caiso.com/Documents/110825DepartmentofMarketMonitoringUpdate.pdf.

[42] WPTF at 6.

market, the entity that owns the generating unit cannot directly replace this generation with other resources.[43] However, an entity with a day-ahead import schedule can procure any other source of energy to import over the intertie should the entity's planned source become unavailable. In addition, should the entity not have a source of energy arranged by the time of the hour-ahead market due to generation or transmission unavailability, the entity may "buy back" its day-ahead schedule in the hour-ahead scheduling process. Price spikes in the hour-ahead scheduling process are much less frequent than in the five-minute real-time dispatch. An entity with an import schedule is only exposed to the five-minute real-time price if the entity is unable to E-tag any schedules after the hour-ahead scheduling process during the real-time checkout process. Thus, this added scheduling flexibility and the lower frequency of price spikes in the hour-ahead scheduling process makes hedging of delivery risk for day-ahead import schedules much less important than hedging of generation outages.

6. Convergence Bidding at the Interties Is Not Needed to Facilitate Imports of Renewable Resources

In addition, WPTF claims that a benefit of convergence bidding at the interties is hedging of deliveries by intermittent or variable (*i.e.*, renewable) resources.[44] No trade association or other party representing the interests of renewable power makes a similar claim that hedging provides them with such a

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[43] If the entity does have additional unscheduled capacity from other units in real-time, the entity could submit a self-schedule in the real-time market for other units to compensate for day-ahead schedules the entity is unable to deliver on due to an outage.

[44] WPTF at 6.

benefit.[45] Further, this issue was addressed in the stakeholder process for the tariff amendment and in the August 18 DMM Memorandum. In that Memorandum, the DMM first explained that, with convergence bidding, an entity seeking to import energy from a renewable resource could schedule its day-ahead forecast of expected output as virtual supply. Then, prior to the hour-ahead market, the entity could purchase transmission as needed based on an updated forecast of available supply. The entity could then schedule the expected output of the renewable resource as a physical schedule in the hour-ahead market. This would allow the entity to earn the day-ahead price for most of its output, but avoid purchasing excess transmission in the event its day-ahead forecast of supply exceeds its hour-ahead forecast. The DMM went on to explain, however, that convergence bidding at the interties is not needed to achieve this result. Alternatively, the entity could achieve the same financial outcome for its renewable resource by scheduling its day-ahead forecast of supply as a physical import in the day-ahead market. The entity could then simply adjust its physical import schedule in the hour-ahead market based on its updated forecast of available supply and purchase the amount of transmission needed to meet this updated schedule. The DMM explained that it has discussed this scenario with numerous stakeholders to confirm that these two

[45] Similarly, although Financial Marketers state that convergence bidding at the interties is particularly useful for external renewable resources selling energy into the ISO markets (*see* Financial Marketers at 19-20), no actual renewable importers filed comments opposing elimination of convergence bidding at the interties. Financial Marketers expressly state that they do not import renewable resources. *See id.* at 1-2 (alleging that elimination of convergence bidding harms Financial Marketers and other convergence trading companies as well as *competing suppliers of electricity from outside the state, in particular, renewable energy suppliers*") (emphasis added).

alternative approaches are financially equivalent and that convergence bidding is not needed to facilitate imports of renewable or other resources with variable output. Analysis by the DMM and discussion with stakeholders also indicated that this practice is not being used to facilitate imports of renewable generation.[46]

In connection with its arguments related to hedging by intermittent resources, WPTF also claims that there have been instances where the ISO has investigated parties for submitting schedules at the interties that do not reflect actual physical deliveries and for otherwise modifying intertie schedules, and therefore that convergence bidding is "seen by importers" as a more acceptable practice for hedging the price risk of variability than "using physical scheduling and creating behavioral compliance risks."[47] WPTF provides no support for its claims. No actual renewable importer argues that it would be deterred from making adjustments to day-ahead schedules due to "behavioral compliance risks" or any other reason. In addition, the DMM Memorandum makes it clear that, as a general matter, the DMM considers the alternative scheduling practice to address the importing of variable resources to be an appropriate bidding behavior.[48] Should the ISO or DMM actually contact any entity adjusting its schedules to account for renewable resource variability in a particular case – as hypothesized by WPTF – the entity would have ample opportunity to explain its

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[46] August 18 DMM Memorandum at 6-7.

[47] WPTF at 6.

[48] The ISO also notes that the Commission ultimately determines if a particular activity violates a market behavior rule.

reasons for making such adjustments.[49] Thus, WPTF's assertion that "behavioral compliance risks" would deter imports of renewable energy should be disregarded.

7. Convergence Bidding at the Interties Is Not Producing Any Other Significant Benefits

The Commission has stated that convergence bidding generally can have benefits for reliability and market efficiency.[50] However, the ISO demonstrated in its tariff amendment that convergence bidding at the interties has not provided any such benefits. In particular, the practice of offsetting virtual bids has served no operational purpose. Because these virtual bids are offsetting, they do not lead to a change in day-ahead unit commitment or improved system-wide market efficiency.[51] Further, with regard to unit commitment, if scheduled demand is less than the ISO forecasted demand in the day-ahead market, the ISO's residual unit commitment process must procure additional capacity to meet the forecasted demand as well as any forecasted shortfalls of minimum generation requirements. In fact, cleared virtual supply often outweighs cleared virtual demand and, as a result, more units are committed in the residual unit commitment process. Accordingly, more residual unit commitment capacity is needed to replace the net virtual supply with physical supply. This situation is

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[49] Even if the DMM believed that such scheduling adjustments may violate any Commission or ISO market rule, the only action that the ISO or DMM could take would be to refer the matter to the Commission. *See* ISO tariff, Appendix P, Section 11.

[50] 130 FERC ¶ 61,122, at P 35.

[51] Rothleder testimony at 14.

also likely to increase the direct costs and bid cost recovery payments associated with residual unit commitment.[52]

The Commission has also stated that a potential benefit of convergence bidding is improved liquidity (*i.e.*, greater numbers of bids and trades) in the market.[53] In this regard, commenters argue that allowing convergence bidding at the interties adds more liquidity in the ISO markets.[54] They do not, however, explain what kind of liquidity is added and do not explain what benefits such liquidity provides to the ISO markets overall. In fact, the offsetting of virtual supply bids and virtual demand bids in the ISO markets does nothing to improve liquidity, because the offsetting bids cancel each other out. Further, liquidity is not intended to be an end in itself. Rather, it is merely a means to the end of improving day-ahead and real-time price convergence and market conditions.[55] As explained above, convergence bidding at the interties is not causing prices to converge or improving the market.

Financial Marketers and WPTF erroneously argue that one of the benefits of convergence bidding is that it reduces prices.[56] These commenters fail to cite

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[52] Transmittal letter for tariff amendment at 14-15; DMM Quarterly Report at 4, 26-27.

[53] 130 FERC ¶ 61,122, at PP 30, 35.

[54] FIEG at 7; Financial Marketers at 11-12; NRG Companies at 4; WPTF at 7.

[55] *See* 130 FERC ¶ 61,122, at P 35 ("By expanding the number of offers to buy and sell in the day-ahead market, convergence bidding helps prevent the exercise of market power. Without convergence bidding, participants with market power may have the ability to influence prices in the day-ahead market that causes the forward price to be systematically different than real-time prices.").

[56] Financial Marketers at 20; WPTF at 20-21. Although WPTF states that it "does not proclaim the object of convergence bidding should be to lower costs," WPTF also makes the vague and unsupported assertion that "overall costs may well have been lower with intertie convergence bidding." WPTF at 21.

to any Commission order on convergence bidding that states that reducing prices is one of the benefits of convergence bidding. And indeed the ISO is unaware of any Commission order that makes that statement. Rather, as explained above, convergence bidding is intended to reduce *differences* between day-ahead and real-time prices, which is what convergence bidding at the interties has failed to do. Further, these commenters fail to provide any evidence to support their assertions that eliminating convergence bidding at the interties will increase prices.

Commenters claim that maintaining convergence bidding at the interties is necessary to reduce implicit convergence bidding, *i.e.*, scheduling of physical bids in the day-ahead market with no intention of physically delivering on the schedule, for the purpose of liquidating the schedule in the hour-ahead scheduling process.[57] These commenters provide no evidence to support their claims. Further, even with the elimination of convergence bidding at the interties, the ISO will still have a number of Commission-approved measures in place to address implicit convergence bidding. In the proceeding on the ISO tariff amendment to implement convergence bidding at the interties, the ISO explained that implicit convergence bidding at the interties is possible because resources associated with intertie energy bids will not be identified until intertie schedules are tagged and a resource in a neighboring balancing authority is designated as providing energy for an intertie schedule. To address this issue, the ISO added measures to its tariff to address implicit convergence bidding that included: (1)

[57] Financial Marketers at 9-12; NRG Companies at 4; WPTF at 6.

charging scheduling coordinators the difference between the day-ahead and the hour-ahead scheduling process price when their imports or exports fail to submit proper E-tags; (2) adjusting CRR revenue due to scheduling coordinators' day-ahead import or export schedule reductions in the hour-ahead scheduling process; and (3) applying uplift costs to imports that clear in the day-ahead market that scheduling coordinators reduce in the hour-ahead scheduling process.[58] In accepting these tariff measures, the Commission stated that "we accept as just and reasonable the proposed revisions to deter implicit convergence bidding."[59] These tariff provisions to deter implicit convergence bidding remain in force, and the ISO does not propose to modify or delete them in the tariff amendment in the instant proceeding.[60] Therefore, even in the absence of convergence bidding at the interties, the ISO will have sufficient tariff measures in place to address implicit convergence bidding.

Powerex states that, although it supports elimination of convergence bidding at the interties, the ISO should also institute measures in addition to the existing measures to address implicit virtual bidding.[61] It would be inappropriate for the ISO to implement such additional measures at this time. In the

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[58] Transmittal letter for ISO tariff amendment, Docket No. ER10-1559-000, at 13-16, 17-20 (June 25, 2010) (describing provisions to be added in new Sections 11.2.4.6, 11.8.6.6, and 11.32 of the ISO tariff).

[59] *California Independent System Operator Corp.*, 133 FERC ¶ 61,039, at PP 130-34 (2010).

[60] In this regard, the ISO proposes only ministerial changes to Section 11.2.4.6 of the ISO tariff to reference the defined term *transmission constraint*. Transmittal letter for tariff amendment at 19.

[61] Powerex at 17-25.

stakeholder process for this tariff amendment, the ISO concluded based on stakeholder input that additional measures to address implicit virtual bidding may have negative unintended consequences which could not be fully assessed at this time.[62] Because the ISO is unaware of significant issues related to implicit convergence bidding on the interties at this time, the ISO believes there is no need to delay the benefits to the market of eliminating convergence bidding at the interties while additional measures to address implicit convergence bidding are evaluated. As Powerex notes, the ISO believes that the issue raised by Powerex can and should be addressed as part of the redesign of the ISO's real-time market.[63] Therefore, the ISO intends to address it in that proceeding.

B. Eliminating Convergence Bidding at the Interties Will Have the Additional Benefit of Addressing the Issues Resulting from the Use of Dual Intertie Constraints

Several commenters argue that the problems resulting from the use of dual intertie constraints do not provide a sufficient reason for eliminating convergence bidding at the interties.[64] These commenters misunderstand the explanation provided in the tariff amendment. The ISO did not assert that the dual constraint problems alone are a sufficient reason for eliminating convergence bidding at the interties, but rather that eliminating the dual constraint problems is a separate benefit that can be achieved by eliminating

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62 Attachment F to tariff amendment, Memorandum from Keith Casey, Vice President, Market & Infrastructure Development, to ISO Board of Governors, at 6-7 (Aug. 18, 2011) ("Board Memorandum").

63 Powerex at 22.

64 FIEG at 9-10; Financial Marketers at 8-9; NRG at 6; WPTF at 23-24.

intertie convergence bidding.[65] As explained above, elimination of convergence bidding at the interties is appropriate and necessary to address the issues related to price convergence and real-time imbalance energy offset costs. The ISO would have proposed to do so even if the problems that the ISO has identified with the use of dual intertie constraints did not exist. However, an additional benefit of eliminating convergence bidding at the interties is that it will address those dual intertie constraint problems.

C. The ISO Has Justified Its Decision Not to Adopt Any of the Proposed Alternatives to Eliminating Convergence Bidding at the Interties at This Time

The ISO explained in the tariff amendment that eliminating convergence bidding at the interties is the only reasonable action the ISO could take to promptly and effectively address the real-time imbalance energy offset issues it faces. As part of the stakeholder process for the tariff amendment, the ISO thoroughly considered a number of proposed alternative approaches but determined that none of them adequately address the problems of lack of price convergence, increased real-time imbalance energy offset costs, and price inconsistency, or concluded that the proposed alternative approaches had a significant potential to create other problems.[66]

Some commenters on the tariff amendment renew their requests that the ISO adopt one of the alternative approaches. These commenters fail to acknowledge that the proper legal standard of review for the tariff amendment is

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[65] Transmittal letter for tariff amendment at 13-16.

[66] Transmittal letter for tariff amendment at 16-18; Board Memorandum at 4-6.

whether the ISO's proposal to eliminate convergence bidding at the interties is just and reasonable under Section 205 of the Federal Power Act, not whether some other alternative is also just and reasonable.[67] As the Commission has explained, "the courts and this Commission have recognized that there is not a single just and reasonable rate. Instead, we evaluate [proposals under Section 205] to determine whether they fall into a zone of reasonableness. So long as the end result is just and reasonable, the [proposal] will satisfy the statutory standard."[68] For the reasons discussed above, the ISO's proposal to eliminate convergence bidding at the interties falls well within the zone of reasonableness and will produce a just and reasonable end result.

Financial Marketers and WPTF argue that the ISO has not sufficiently justified why it did not select either the alternative approach of prohibiting offsetting internal and external virtual bids or the approach of implementing a settlement rule designed to allocate the real-time instructed imbalance energy offset costs caused by such bids directly back to market participants profiting from such bids.[69] The ISO has provided sufficient justification for that decision. As Mr. Rothleder explained in his testimony, the ISO determined that neither of these approaches would be effective for several reasons. First, offsetting virtual

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[67] *See New England Power Co.,* 52 FERC ¶ 61,090, at 61,336 (1990), *aff'd, Town of Norwood v. FERC,* 962 F.2d 20 (D.C. Cir. 1992) (rate design proposed need not be perfect, it merely needs to be just and reasonable), *citing Cities of Bethany, et al. v. FERC,* 727 F.2d 1131, 1136 (D.C. Cir.), *cert. denied*, 469 U.S. 917 (1984) (utility needs to establish that its proposed rate design is reasonable, not that it is superior to all alternatives).

[68] *Calpine Corp. v. California Independent System Operator Corp.*, 128 FERC ¶ 61,271, at P 41 (2009) (citations omitted).

[69] Financial Marketers at 14-15; WPTF at 22-23. FIEG (at 10) makes a similar argument.

supply and demand bids by the same market participant only account for a portion of all offsetting bids that are contributing to the real-time instructed energy offset costs.[70] Second, if such a prohibition or settlement rule were implemented, it would still be profitable for individual market participants to submit either virtual supply bids or virtual demand bids within the ISO. The ISO would expect some market participants currently placing offsetting bids to increase the volume of virtual imports, while others would increase the volume of virtual demand within the ISO. There is also the possibility that some market participants would develop bilateral arrangements that had the same effect of placing offsetting virtual supply and demand bids as a way of "betting" on the difference in hour-ahead and real-time dispatch prices. The net result would be a continuation of a large volume of offsetting virtual supply and demand bids, and high real-time instructed energy imbalance costs. The ISO's Market Surveillance Committee and Department of Market Monitoring also looked at this issue and both came to this same conclusion.[71] Because the ISO's market monitoring entities reached the same conclusion, Financial Marketers and WPTF are incorrect in asserting that the ISO has provided no justification as to why this particular form of collusive behavior could not be addressed using the ISO's existing market monitoring and enforcement mechanisms.[72]

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[70] See the discussion of offsetting real-time imbalance energy offset costs in Section II.A, above.

[71] Rothleder testimony at 16-17.

[72] *See* Financial Marketers at 15; WPTF at 22.

Financial Marketers argue that it was "inexplicable" for the ISO not to select the alternative approach of modifying the timing of convergence bidding liquidation and settlement for internal virtual supply and demand.[73] However, contrary to Financial Marketers' claims, the ISO provided a sufficient explanation in the tariff amendment for not selecting that alternative approach. The ISO explained that employing the alternative approach would pose reliability risks given the importance of imports to meeting ISO load. In particular, in the case where there is net internal virtual supply, the ISO would be unable to secure additional physical imports in the hour-ahead scheduling process to replace the net internal virtual supply.[74]

Financial Marketers and WPTF argue that the ISO has not sufficiently justified its decision not to select the alternative approach similar to the approach taken by the New York Independent System Operator, Inc. ("NYISO"), under which exports scheduled on an hour-ahead basis are charged as "price-takers" based on real-time prices, while any additional import bids accepted on an hour-ahead basis are paid the higher of their bid price or the real-time dispatch price.[75] These commenters fail to mention that Mr. Rothleder addressed this subject in his testimony. As Mr. Rothleder explained, the ISO requires additional time to

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[73] Financial Marketers at 15-16.

[74] Transmittal letter for tariff amendment at 17-18; Rothleder testimony at 19-20. The ISO also addressed this issue in the stakeholder process for this tariff amendment. *See* Impact of Convergence Bidding on Interties – Revised Straw Proposal, at 4 (June 10, 2011), available on the ISO website at http://www.caiso.com/Documents/RevisedStrawProposalImpactofConvergenceBiddingonInterties.pdf.

[75] Financial Marketers at 16-17; WPTF at 23.

consider whether implementing an approach such as the NYISO approach would be appropriate. Therefore, as part of another ongoing stakeholder process, the ISO is proceeding to give further consideration to the NYISO approach (or a similar approach) as an intermediate option that might be implemented by 2013.[76] The stakeholder process that Mr. Rothleder described is the Renewables Integration Market and Product Review Phase 2 initiative,[77] which is an umbrella initiative that encompasses a number of stakeholder initiatives, including the Intertie Pricing and Settlement stakeholder initiative. The ISO has issued a Renewable Integration Market Vision and Roadmap document stating that the Intertie Pricing and Settlement stakeholder initiative will include discussion of the NYISO approach.[78]

Because of the potential for unintended consequences, a full and deliberate consideration of the NYISO approach will take time to gather data and run market simulations as well as to obtain further stakeholder input. In the meantime, however, there is no justification for continuing the market inefficiencies caused by convergence bidding at the interties, which impose millions of dollars of uplift costs on the market each month without any

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[76] Rothleder testimony at 17-18.

[77] Materials regarding the Renewables Integration Market and Product Review Phase 2 initiative are available on the ISO website at http://www.caiso.com/informed/Pages/StakeholderProcesses/RenewablesIntegrationMarketProductReviewPhase2.aspx.

[78] Renewable Integration Market Vision and Roadmap at 10-11 (Oct. 11, 2011), available on the ISO website at http://www.caiso.com/Documents/RenewablesIntegrationMarket-ProductReviewPhase2Vision-Roadmap.pdf.

corresponding benefit of promoting day-ahead/real-time price convergence or providing any other significant benefit to the market.

NRG Companies and WPTF argue that, instead of eliminating convergence bidding at the interties, the ISO should eliminate the hour-ahead scheduling process settlement.[79] The Commission should reject that proposed alternative. As explained above, the ISO's proposal to eliminate convergence bidding at the interties is just and reasonable and will eliminate much of the financial impact of market inefficiencies resulting from the two-settlement system in real-time. Nevertheless, the ISO acknowledges that the hour-ahead scheduling process settlement needs to be thoroughly evaluated and possibly revised, and acknowledges that eliminating convergence bidding at the interties will not address all of the issues with the hour-ahead scheduling process settlement. However, eliminating the hour-ahead scheduling process settlement simply is not feasible at this time. It would require making fundamental changes to the way that the ISO's markets operate, because the hour-ahead scheduling process settlement is a fundamental feature of the ISO's market design.[80] Because the ISO balancing authority area is dependent upon imports to meet the needs of California customers during many periods and because the rest of the Western interconnection has not moved to a more granular settlement time frame, the ISO will need to fully develop any replacement for the current two-

[79] NRG Companies at 5-7; WPTF at 8-18, 24-26.

[80] *See, e.g.*, 116 FERC ¶ 61,274, at PP 98-103, 183-234 (describing functions of the hour-ahead scheduling process within the ISO market design structure).

settlement approach in real-time before the hour-ahead scheduling process potentially can be eliminated.

The ISO has begun a stakeholder process that hopefully will achieve these types of far-reaching market design changes – the Renewables Integration Market and Product Review Phase 2 initiative. However, this stakeholder process must consider a wide range of factors in determining the appropriate long-term enhancements to the design of the ISO's markets. The stakeholder process was initiated only this past spring, and the ISO does not expect it to be completed in the near future. In these circumstances, it is reasonable to eliminate convergence bidding at the interties, at least until such time as that stakeholder process (or some other stakeholder process) may lead to resolution of fundamental market design issues. At that time, the ISO may convene a new stakeholder process to determine whether convergence bidding at the interties should be reinstituted.[81] The Commission should not, however, short-circuit the existing stakeholder process by directing elimination of the hour-ahead scheduling process settlement.[82]

There is no merit to WPTF's unsupported assertion that the issue of elimination of the hour-ahead scheduling process settlement (plus other important market design issues) could be resolved or decided in a two-month stakeholder process in time to take effect prior to the summer of 2012.[83] Nor

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[81] Transmittal letter for tariff amendment at 19.

[82] For similar reasons, the Commission should also reject the request of DC Energy for a technical conference. DC Energy at 3.

[83] WPTF at 27-28.

does WPTF provide any support for its assertion that the ISO's settlement systems could be modified to meet WPTF's proposed schedule.[84] Again, eliminating the hour-ahead scheduling process settlement would be a far-reaching change to the ISO's tariff and settlement systems. Therefore, the Commission should reject WPTF's proposal for expedited elimination of the hour-ahead scheduling process settlement.[85] Instead, the issue of the hour-ahead scheduling process settlement should be addressed in the ongoing ISO stakeholder process described above. Getting this stakeholder process right will take time and effort on the part of the ISO and stakeholders. It would be dangerous and would invite unintended consequences to create arbitrary deadlines for the stakeholder process.[86]

As explained in Section II.A, above, the ISO's Market Surveillance Committee and Department of Market Monitoring both expressly support elimination of convergence bidding at the interties. The MSC and DMM both also suggest further action in the event that eliminating convergence bidding at the interties does not sufficiently reduce real-time imbalance energy offset costs. Consistent with the suggestions of the MSC and DMM, the ISO plans to continue

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84 *Id.* at 28.

85 *Id.*

86 In addition, WPTF erroneously asserts that Eric Hildebrandt, Director of the DMM, stated at the ISO Board of Governors meeting authorizing the submittal of the tariff amendment that it would take three or four years to modify the settlement of interties. WPTF at 27. In fact, the three-to-four-year time frame mentioned by Dr. Hildebrandt at the Board meeting was in regard to a more comprehensive or complete redesign of the ISO's hour-ahead and five-minute real-time markets. Moreover, at the Board meeting, Dr. Hildebrandt reiterated the statement in the August 18 DMM Board Memorandum that one of the DMM's recommendations to the Board was that, in addition to taking the short-term action of eliminating convergence bidding at the interties, the ISO should continue to consider intermediate action such as modifying the prices at which hour-ahead intertie transactions are settled. *See* August 18 DMM Memorandum at 1, 7.

to operate the system to improve convergence between the hour-ahead scheduling process prices and real-time dispatch prices and will consider whether market design changes are appropriate.

D. The Commission Should Disregard Issues that Are Beyond the Scope of this Proceeding

Some commenters raise issues that are beyond the scope of this proceeding. The Commission should not consider those issues here.

SWP supports the ISO's tariff amendment and also requests further investigation to examine the costs and benefits to ISO ratepayers of convergence bidding internal to the ISO.[87] SWP's request for an investigation is beyond the scope of this proceeding to eliminate convergence bidding at the interties and is unsupported from any evidence. It is important to note, however, that the ISO and market participants continue to observe the impact of convergence bidding on the ISO markets. To date, the ISO has not identified any issue with convergence bidding on internal nodes. Should such issues arise, the ISO stands prepared to assess the concerns, seek stakeholder input, and, if appropriate, propose appropriate remedial actions to the Commission.

As explained in Section II.A, above, the existing ISO tariff includes a provision to adjust CRR revenue due to scheduling coordinators' day-ahead import or export schedule reductions in the hour-ahead scheduling process. Powerex asserts that this existing tariff provision should be subject to further ISO review but also acknowledges that evaluation of the provision is "beyond the scope of this proceeding" on the ISO's tariff amendment to eliminate

[87] CDWR at 1-2.

convergence bidding at the interties.[88] Therefore, to the extent the ISO determines that it should review the existing CRR schedule adjustment provision further, the ISO will do so outside of this proceeding.

III. Conclusion

For the reasons explained above, the Commission should accept the ISO's September 21, 2011, tariff amendment as submitted in this proceeding without condition or modification.

Respectfully submitted,

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Dated: October 27, 2011

[88] Powerex at 14-16.

ATTACHMENT A

Memorandum

To: ISO Board of Governors

From: Eric Hildebrandt, Director, Market Monitoring

Date: October 20, 2011

Re: **Market Monitoring Report**

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This report provides comments and analysis by the Department of Market Monitoring (DMM) on three issues:

- **Multi-stage generating unit enhancements.** DMM is supportive of enhancements being proposed to the multi-stage generating resource software. The performance of this functionality appears to have improved significantly since it was implemented in December 2010. The proposed enhancements can benefit both the ISO system and multi-stage units by dispatching these resources more accurately and efficiently. These enhancements may also encourage more resources to be modeled as multi-stage units. Currently only about one-third of 14,400 MW of combined cycle capacity in the ISO system is operating as multi-stage generating units. However, DMM continues to recommend that as part of a future initiative, the ISO seek to develop an improved approach for limiting bids for transition costs submitted by multi-stage unit owners representing the cost for these units to transition from one configuration to another.

- **Bid cost recovery payments.** Bid cost recovery payments are intended to ensure that generators receive enough market revenues to cover the cost of all their bids that are dispatched by the ISO. Early this year, the ISO had identified several aspects of bid cost recovery calculations which – when exploited by certain manipulative bidding behaviors – led to excessively high bid cost recovery payments for the day-ahead market. In April and June, the ISO made two emergency filings with the Federal Energy Regulatory Commission to modify bid cost recovery rules to mitigate this behavior. After the June filing, the levels of bid cost recovery dropped dramatically. In the third quarter, bid cost payments associated with the day-ahead market have dropped 90 percent and overall bid cost recovery payments have

declined by almost 50 percent compared to the second quarter. However, real-time bid cost recovery payments have increased by about 50 percent for the same period. Analysis by DMM indicates this increase is primarily related to exceptional dispatches made by the ISO to commit additional capacity after the day-ahead market to protect against contingencies during peak system days and requirements for ramping capacity south of Path 26.

- **Convergence bidding on inter-ties.** In September the ISO filed with the FERC to eliminate convergence bidding on the interties. A decision from FERC on this filing is expected in November. The elimination of convergence bidding on interties is expected to decrease revenue imbalances by eliminating convergence supply bids at interties that are offset by an equal quantity of convergence demand bids at nodes within the ISO. Whenever hour-ahead prices are lower than real-time prices, these offsetting supply and demand bids do not help to converge prices in these markets, but create revenue imbalances that are ultimately allocated to load serving entities. In August and September, price convergence in these markets improved substantially due to a series of additional software and operational improvements, leading to a significant reduction in revenue imbalances created by these offsetting convergence bids. However, these offsetting convergence bids still contributed an average of about $3.3 million per month to revenue imbalances. These trends illustrate that that despite recent improvement in price convergence, eliminating convergence bidding at the inter-ties remains important until the ISO addresses structural differences between the hour-ahead and real-time markets.

Multi-stage generating unit enhancements

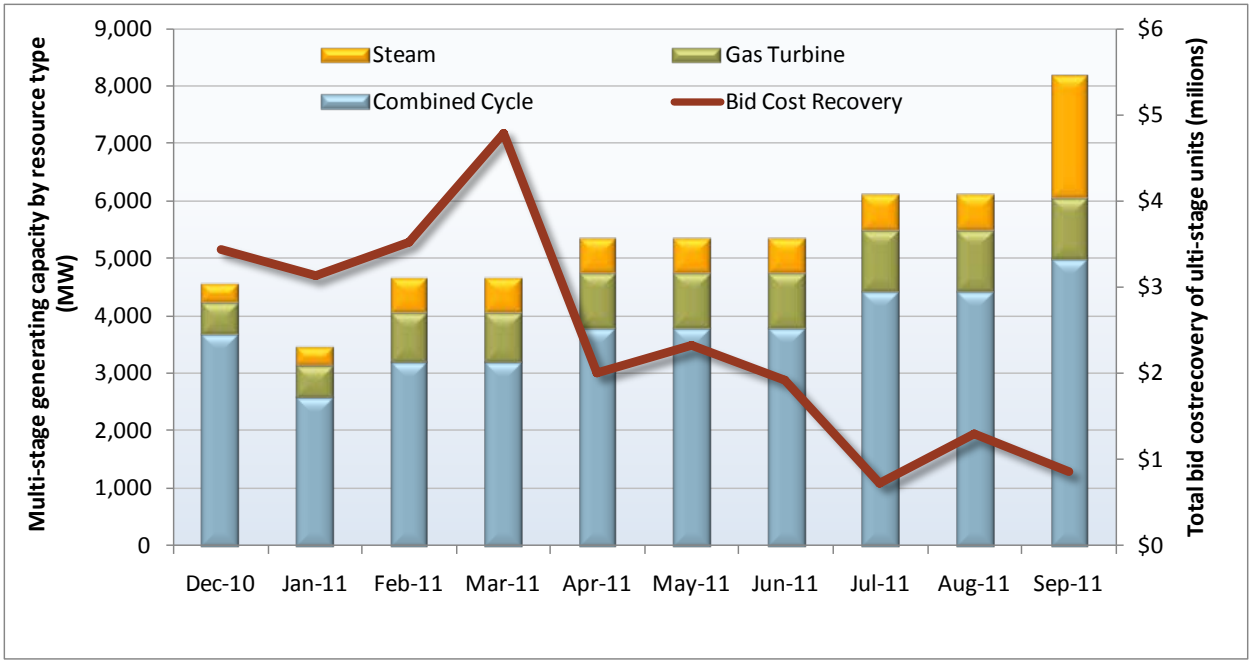
Management is seeking approval for a variety of enhancements to the existing modeling functionality for multi-stage generation resources. Most of these enhancements are designed to provide generators selecting to be treated as multi-stage generating units additional flexibility in how these resources are modeled and scheduled. This flexibility can benefit generators and the ISO system by allowing units to be dispatched more efficiently and consistently with their actual operating characteristics. By making this functionality more attractive for generation owners, the ISO also hopes to increase the amount of generating capacity operating as multi-stage resources.

DMM is supportive of these enhancements as a way of making this functionality more effective for both the ISO and generating units that can be more accurately modeled as multi-stage resources. Currently only about one-third of 14,400 MW of combined cycle capacity in the ISO system is operating as multi-stage generating units. The performance of this functionality appears to have improved significantly since it was implemented in December 2010. Two quantifiable measures of this improvement are reductions in the

frequency of exceptional dispatches issued for multi-stage units and the amount of bid cost recovery payments made to these resources.

As shown in Figure 1, the amount of capacity opting to be modeled as multi-stage generation has increased from about 4,500 MW to almost 8,200 MW since December 2010. Meanwhile, bid cost recovery payments for these units have declined from an average of about $3.7 million per month during the first four months of this new functionality, to an average of about $1 million in the third quarter of 2011. For multi-stage generating units, most bid cost recovery payments occur in the real-time market, with much of this being incurred when ISO operators must issue exceptional dispatches to these units to modify or override dispatch instructions issued directly by the market software.

Figure 1. Multi-stage generation capacity and bid-cost recovery payments



As noted in Management's memo on this topic, one of the potential strengths of multi-stage generating unit modeling is that it accounts for the costs and operational constraints associated with transitioning between operating configurations. Currently, participants are afforded significant flexibility in the value of transition costs they submit to represent the costs incurred by a resource when transitioning from one configuration to another. Transitions costs used by the market software are based on costs submitted by participant to the ISO bounded by rules developed by the ISO.

DMM has previously expressed several concerns about current rules for these transition costs, since transition costs submitted by participants can be significantly in excess of actual costs and the basis for limiting costs is not clearly defined or verifiable. Thus, DMM has recommended an approach for more accurately accounting for transition costs based directly on fuel usage rates. DMM continues to recommend that as part of a future initiative, the ISO seek to develop an approach for limiting transition cost bids based on some percentage of verifiable costs – including both fuel and any non-fuel costs that a generator can demonstrate are associated with transitioning from one configuration to another.[1]

Bid cost recovery payments

Bid cost recovery payments are designed to ensure that generators receive enough market revenues to cover the cost of all their bids dispatched by the ISO. Early this year, the ISO had identified flaws in the calculation of these payments which – when exploited by certain manipulative bidding behaviors – led to excessively high bid cost recovery payments associated with the day-ahead market. In April and June, the ISO made two emergency filings with the FERC to modify bid cost recovery rules to mitigate this behavior.

Since these rule changes, bid cost recovery payments have dropped significantly, particularly for the day-ahead market. As shown in Figure 2:

- Overall bid cost recovery payments are down about 50 percent in the third quarter relative to the second quarter.

- Bid cost recovery payments associated with the day-ahead market (represented by the blue bar) have decreased by 90 percent in the three months since bid cost recovery rules were last modified.

- However, bid cost recovery payments associated with real-time market dispatches have increased by almost 50 percent in the third quarter.

Operating logs indicate the increase in real-time payments primarily related to exceptional dispatches made by the ISO to commit additional capacity after the day-ahead market for two reasons:

- Exceptional dispatches for system capacity help to meet generation capacity requirements for the entire ISO region. As noted in DMM's 2010 annual report, this

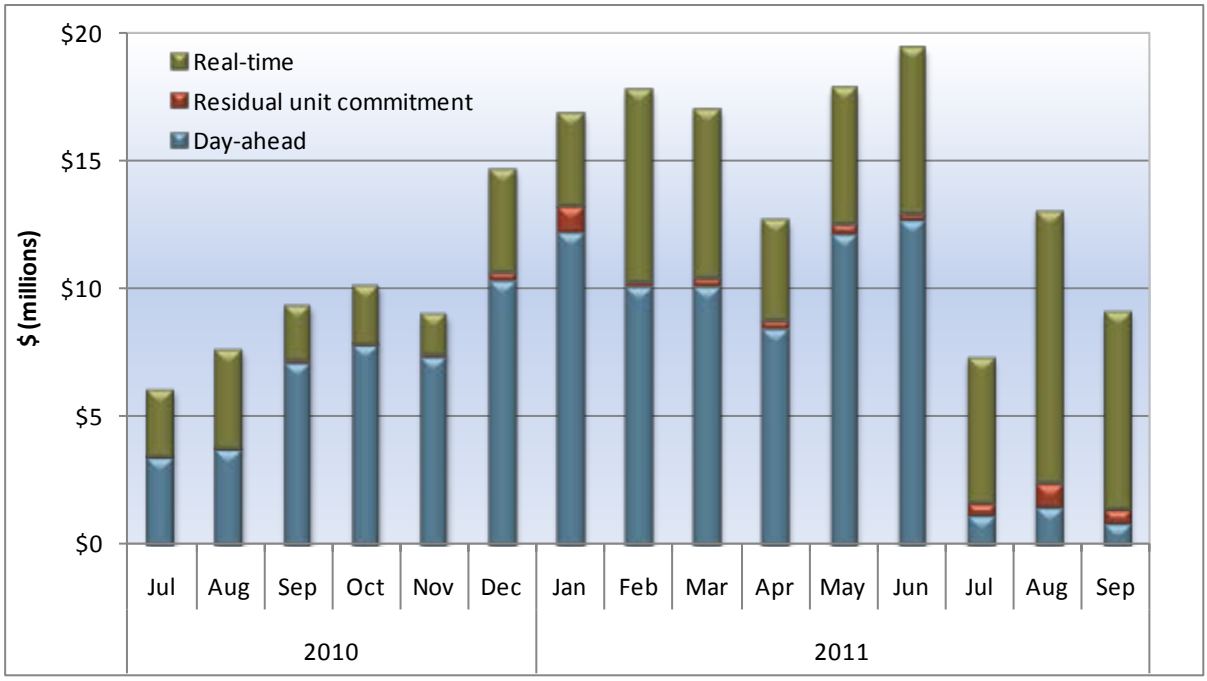
[1] The ISO's original proposal under this initiative called for modifying transition cost rules along the lines previously recommended by DMM. Some stakeholders argued that there are significant non-fuel costs associated with transitioning between configurations that should be included in transition costs. However, no specific information on these costs has been provided. Nevertheless, in response to this stakeholder input, Management's final proposal does not include any modifications to current transition cost limitation rules.

type of unit commitment typically occurs when system loads approach their annual peaks in the late summer months.[2] These additional unit commitments are made after the day-ahead market to protect the system from voltage collapse and potential thermal overloads on critical inter-ties should worst-case contingencies occur.

- Additional on-line capacity located south of Path 26 that can be ramped up in 30 minutes to meet a contingency such as an outage on the of the Nevada-Oregon Border (NOB) transmission path, also known as the Pacific DC Inter-tie (PDCI).

In July and August, most unit commitments for these two reasons coincided with peak load days. In September, much of these commitment were associated with the outage of the 500 kV line connecting Arizona with the ISO and peak load days.

Figure 2. Bid cost recovery payments



Exceptional dispatches will continue to be necessary to resolve circumstances not addressed by the market model. Even so, DMM recommends that the ISO monitor its use of exceptional dispatches and seek to limit its impact on bid cost recovery payments. DMM will continue to monitor and analyze bid cost recovery payments for anomalies and will make further recommendations and referrals as necessary.

[2] See discussion of exceptional dispatches in DMM's *2010 Annual Report on Issues and Performance*, pp. 70-74. http://www.caiso.com/Documents/2010AnnualReportonMarketIssuesandPerformance.

Convergence bidding on inter-ties

As noted in DMM's report for the August Board meeting, market performance since convergence bidding was implemented in February 2011 has shown that fundamental structural aspects of the ISO's current market design tend to create systematic differences in hour-ahead and real-time prices. Under this current market design, convergence bidding on inter-ties has allowed some participants to profit from persistent and predictable differences in hour-ahead and real-time price differences. These profits contribute to revenue imbalances that are allocated to load-serving entities without providing any significant market efficiency benefits.

In September, the ISO filed with the FERC to eliminate convergence bidding on inter-ties, pursuant to the Board's decision on this issue at its August meeting. A decision from FERC on this filing is expected in November. The elimination of convergence bidding on inter-ties is expected to decrease revenue imbalances by eliminating convergence supply bids at inter-ties that are offset by an equal quantity of convergence demand bids at nodes within the ISO. Whenever hour-ahead prices are lower than real-time prices, these offsetting convergence bids create revenue imbalances without helping to converge prices in these markets. These revenue imbalances are ultimately allocated to load serving entities through real-time imbalance energy and congestion offset charges.

Although price convergence in the hour-ahead and real-time markets has improved in recent months due to a series of additional software and operational improvements, significant systematic price differences continue in these markets during some periods. As a result, off-setting convergence bids continue to contribute to real-time imbalance energy and congestion offset charges. As show in Figure 3:

- In August and September, real-time offset costs were lower than in any month since May 2010, but still totaled about $12 million per month.

- Despite significant improvements in overall price convergence, offsetting convergence bids still contributed an average of about $3.3 million per month to these charges in August and September.

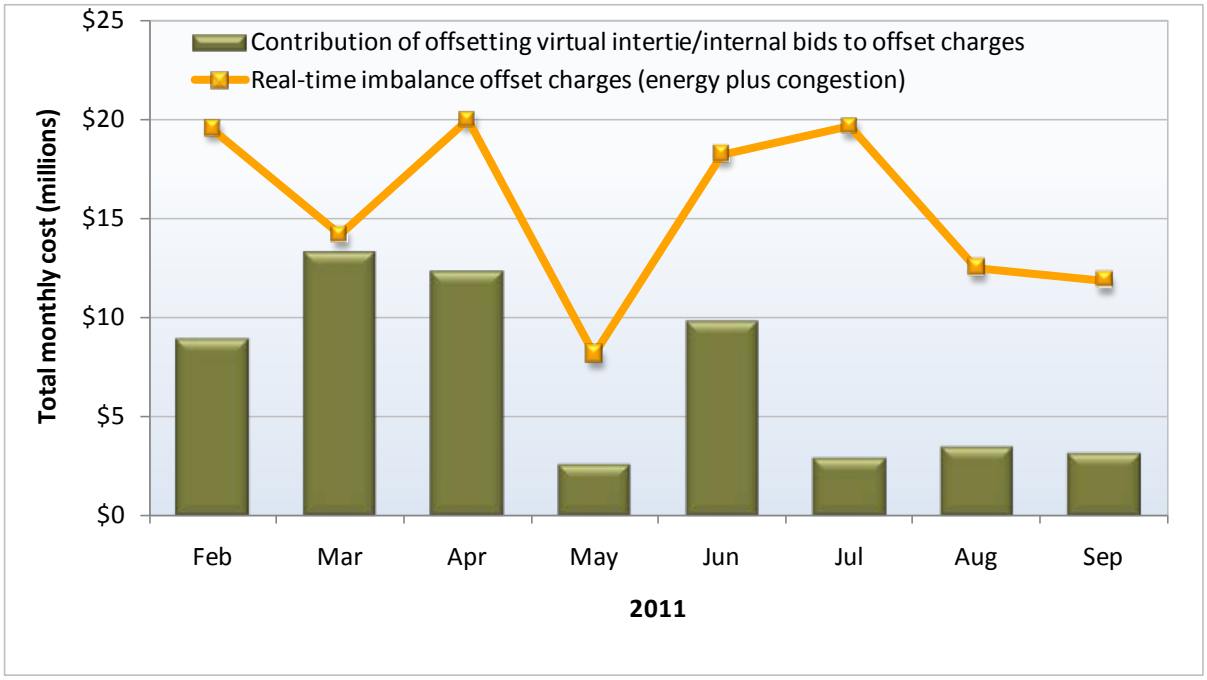
- The remainder of the convergence bidding costs in August and September were mostly attributable to unaccounted for energy.[3] Historically, these costs have been revised downward as better meter data becomes available.

These trends illustrate that that despite recent improvement in price convergence, eliminating convergence bidding at the inter-ties remains important. Historically, the

[3] Unaccounted for energy is attributable to meter measurement errors, power flow modeling errors, energy theft, statistical load profile errors, and distribution loss deviations.

divergence of hour-ahead and real-time prices has also tended to increase in winter and spring months due to market conditions during these periods. Whenever such divergences occur, convergence bidding at the interties can exacerbate real-time offset charges without providing any market efficiency benefits. Thus, DMM believes that the suspension of convergence bidding at the inter-ties is important until the ISO addresses structural differences between the hour-ahead and real-time markets.

Figure 3. Estimated contribution of off-setting convergence bids to real-time imbalance offset charges



ATTACHMENT B

Memorandum

To: ISO Board of Governors

From: Eric Hildebrandt, Director, Market Monitoring

Date: August 18, 2011

Re: **Market Monitoring Report**

This memorandum does not require Board action.

EXECUTIVE SUMMARY

This report provides comments and recommendations by the Department of Market Monitoring on two proposals being presented to the ISO Board of Governors by Management at the August 25-26, 2011 meeting.

- **Convergence bidding on interties.** DMM supports Management's proposal to eliminate convergence bidding for imports or exports on interties as a step that can be implemented immediately to help reduce high real-time imbalance energy offset charges. DMM anticipates this change will significantly reduce these offset charges without creating any decrease in overall market efficiency. However, even without convergence bidding at the interties, high offset charges will continue to result when the ISO reduces net physical imports at relatively low prices in the hour-ahead market and then increases energy purchased from resources within the ISO at higher prices in the 5-minute real-time market. While this trend of "selling low and buying high" has been reduced in recent months through software and operational improvements, a systematic divergence between the hour-ahead and real-time markets persists. A comprehensive re-design of the hour-ahead and 5-minute real-time markets that would address this issue is expected to take several years. Therefore, DMM recommends that the ISO consider additional modifications for settlement of physical intertie schedules that may be implemented on a relatively short time frame. One such interim option DMM believes merits further consideration is the type of settlement rule for physical intertie transactions employed by the New York ISO.

- **Flexible ramping constraint.** DMM supports Management's proposal to implement a new flexible ramping constraint in the real-time market optimization to increase the amount of ramping capacity available in the 5-minute real-time market. This is one of several key software enhancements the ISO anticipates may reduce the frequency and severity of price spikes in the 5-minute real-time market caused by very short and often minor deficiencies of upward ramping capacity. As noted in prior DMM reports, these price spikes generally reflect

forecasting and modeling limitations, rather than fundamental underlying supply conditions.[1] These price spikes account for most of the divergence between prices in the 5-minute real-time market and prices in the day-ahead ahead and hour-ahead markets. The market impact of this new feature is difficult to predict and will need to be assessed by the ISO after implementation. Based on this analysis, the ISO should be prepared to adjust the amount of ramping capacity being procured if necessary to ensure that the benefits exceed the cost of this new constraint.

The more detailed discussion of these proposals provided below is designed to supplement Management's memos and opinions by the Market Surveillance Committee on these two issues being provided to the Board.

CONVERGENCE BIDDING ON INTERTIES

Background

Since the start of the ISO's new market design in 2009, prices in the hour-ahead scheduling process have been systematically lower than prices in the day-ahead and 5-minute real-time dispatch real-time markets. In the hour-ahead market, relatively low prices have led to significant reductions in net imports. In most hours, this reduction in net imports has required the ISO to re-purchase additional energy in the 5-minute real-time market at higher prices. This pattern of selling low in the hour-ahead market and buying high in the real-time market has created substantial revenue imbalances that are allocated to load-serving entities.

Since 2009, DMM has expressed concern that this trend is caused by systematic differences in the inputs and models used in the hour-ahead and 5-minute real-time markets, and may persist unless specifically addressed though enhanced modeling, operational practices or market design changes. For example, when convergence bidding was approved by the Board in October 2009, DMM noted that:

> While further improvements are needed and challenges remain, DMM is optimistic that with the necessary support from Management significant improvements can be made prior to the implementation of convergence bidding more than one year from now. For example, DMM believes that it is important for the ISO to continue to identify and address the root cause of systematic price divergences that have been observed between the integrated forward market (IFM), hour-ahead scheduling process (HASP) and the 5-minute real-time markets prior to implementation of nodal convergence bidding. While nodal convergence bidding is designed to help to resolve some of the price divergence between these markets, it may also be more difficult for the ISO to identify and address once convergence bidding is implemented … [Thus], the ISO should continue to place a high priority on identifying and addressing the root cause of systematic price divergences between the day-ahead and real-

[1] A detailed discussion of this issue was provided in DMM's *Quarterly Report on Market Issues and Performance*, February 8, 2011, pp.10-17, http://www.caiso.com/2b1f/2b1f838819910.pdf.

time markets over the more than 12 months that remain prior to implementation of convergence bidding.[2]

In 2010, the ISO indicated that addressing this price divergence would be a high priority and identified numerous software and modeling enhancements aimed at improving price convergence. In addition to these modeling enhancements, DMM recommended that the ISO also implement improved operational procedures or guidelines for manual adjustments to the load forecast made by system operators that have a significant impact on price convergence between the hour-ahead and 5-minute real-time markets.

However, in 2010 this price divergence persisted despite numerous software enhancements by the ISO. Real-time energy imbalance offset costs caused by price divergence totaled over $80 million. Therefore, prior to implementation of convergence bidding in February 2011, DMM specifically cautioned that unless the causes of this divergence were addressed, convergence bidding may increase these real-time energy imbalance costs. As noted in DMM's 2010 annual report:

> If systematic price differences continue to occur after implementation of convergence bidding in February 2011, this may create substantial additional revenue imbalances that must be allocated to load-serving entities. These price trends may be further exacerbated by the April 2011 increase in the bid cap from $750 to $1,000/MWh.[3]

Since the introduction of convergence bidding, the ISO has implemented numerous additional operational and software changes that appear to have reduced the frequency extreme price spikes in the 5-minute market and increased overall price convergence. However, predictable and systematic price divergences have continued to exist for sustained periods.

Market performance during the first six months of convergence bidding provides convincing evidence that fundamental structural aspects of the ISO's current market design tend to create systematic differences in hour-ahead and real-time prices. Convergence bidding has allowed some participants to profit from persistent and predictable differences in hour-ahead and real-time price differences. These profits contribute to revenue imbalances that are allocated to load-serving entities. However, as explained below and in other board documents, under the ISO's current market design, convergence bidding on the interties is exacerbating energy offset charges without providing any significant market efficiency benefits.

Impact of convergence bidding on interties

The California market has a unique feature that makes it different from other ISOs and RTOs. The ISO's new market design re-optimizes imports and exports at the interties in an hour-ahead market, with all changes to hourly intertie schedules being settled financially based on prices produced by this hour-ahead optimization process. Convergence bids for virtual imports or exports on interties are also settled based on the difference in prices from the

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[2] Memorandum to ISO Board of Governors from Eric Hildebrandt, Interim Director, Market Monitoring, October 21, 2009, p. 2 and p. 8, http://www.caiso.com/Documents/091029InformationalReport-Department-MarketMonitoringReport.pdf,

[3] *2010 Annual Report on Market Issues and Performance*, Department of Market Monitoring, p.2. http://www.caiso.com/Documents/2010AnnualReportonMarketIssuesandPerformance.pdf

day-ahead market and this hour-ahead process. Meanwhile, resources within the ISO dispatched in the 5-minute real-time market are settled based on prices from this 5-minute real-time dispatch. Convergence bids at internal nodes settle are settled based on the difference in prices from the day-ahead market and this hour-ahead process.

This feature of the ISO market design has led to a convergence bidding strategy that allows participants to exploit price divergence between the hour-ahead and real-time market. With this strategy, an entity places a virtual supply bid at an intertie, combined with a virtual demand bid for an equal quantity at a point within the ISO. These offsetting virtual demand and supply bids provide no net supply or demand in the day-ahead market. However, the entity placing these bids receives a payment whenever the hour-ahead price is lower than the 5-minute real time market price.

While this virtual bidding strategy has been highly profitable for some participants, this has increased revenue imbalances allocated to load-serving entities and does not provide any significant benefits in terms of helping to converge prices or increase the efficiency of unit commitment and dispatch. Virtual import schedules offset by virtual demand at internal points from unaffiliated entities also have this same effect of increasing energy offset charges without providing any significant increase in market efficiency.

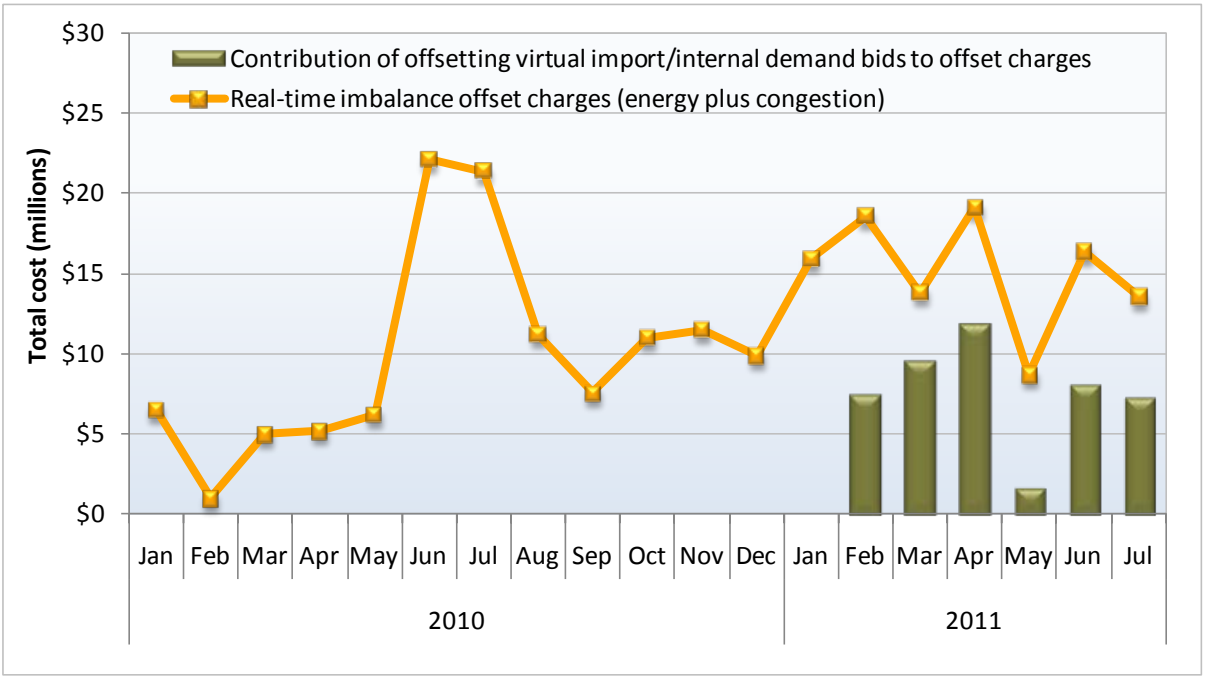
Figure 1 on the following page shows the monthly real-time imbalance offset charges for energy and congestion assessed to load serving entities (see yellow line). The green bars in Figure 1 show the portion of these charges DMM estimates are attributable to payments made for accepted virtual import bids that were offset by accepted virtual demand within the ISO during the same hour. As shown in Figure 1:

- Since the implementation of convergence bidding in February, real-time energy and congestion offset charges have totaled over $100 million or an average of over $17 million per month.

- Since implementation of convergence bidding in February, a large portion of these charges were due to virtual imports at inter-ties that were offset by virtual demand within the ISO and therefore did not provide any benefits from improved unit dispatch or price convergence.

- From February to July virtual imports, DMM estimates that virtual import bids offset by virtual demand bids within the ISO during the same hour have accounted for about $7.7 million per month or approximately 46 percent of real-time energy and congestion offset charges.

Figure 1. Real-time imbalance energy and congesetion offset charges



DMM believes that eliminating convergence bidding at the interties would benefit the ISO markets in several ways:

- **Reduce energy imbalance offset charges**. DMM believes that eliminating virtual bidding at the interties would result in a significant reduction in real-time imbalance energy offset charges. Even if savings from elimination of virtual bidding on interties are lower than the levels currently attributable to virtual import bids offset by virtual demand bids within this ISO, the resulting savings will be significant. As previously noted, DMM recommends that additional steps may be needed to achieve further reductions in offset charges. However, there is no need to defer elimination of virtual bidding at the interties while these additional measures are considered or implemented.

- **Avoid need to modify position limits.** The ISO's initial convergence bidding market design limits the amount of virtual bids each participant may submit on each intertie to 5 percent of the intertie capacity. These position limits were intended to serve as a general precaution that would help mitigate a range of potential market issues, particularly in the initial phases of convergence bidding. Limits on the amount of virtual bids that can be submitted by each participant on each intertie are scheduled to increase to 25 percent of the intertie's capacity on October 1. This increase in position limits has the potential to significantly increase the magnitude of energy offset charge costs. However, the elimination of convergence bidding on interties mitigates this issue as well.

- **Allow internal virtual bids to increase price convergence.** Given the current design for settlement of intertie transactions and the persistent divergence between the hour-ahead and real-time market prices due to market design issues, virtual bidding has failed to contribute to the convergence of prices in these two markets.[4] However, DMM believes that eliminating virtual bids at the interties may allow virtual bidding at internal nodes within the ISO to have a greater effect in terms of promoting price convergence between the day-ahead and 5-minute real-time markets. For example, during periods when real-time prices tend to exceed day-ahead prices, virtual demand bids at locations within the ISO would continue to be profitable. This net demand may increase unit commitment performed in the day-ahead market and help to moderate real-time prices. This could also have the effect of improving convergence of hour-ahead and real-time prices and reduce energy offset charges.

Stakeholder comments

Load-serving entities that are being assessed imbalance energy offset charges strongly support the proposal to eliminate virtual bidding at interties. Stakeholders most vocally opposed to elimination of convergence bidding at interties are financial institutions and traders that do not serve any load or operate any generating resources within the ISO, but are receiving most of the profits from convergence bidding. Entities opposed to the ISO's proposal have contended that convergence bidding at interties provides three main potential benefits:

- **Impact on day-ahead market prices.** Some participants contend that the net effect of convergence bidding has been to lower day-ahead prices, and that the benefits of these lower prices outweighs the costs of higher energy offset charges for load-serving entities. DMM does not believe that the goal of convergence bidding is to lower day-ahead prices – but is instead to improve market efficiency and improve convergence of market prices. DMM also finds this argument uncompelling given that the ISO's proposal is supported by all load-serving entities that actually purchase energy in the ISO markets and must pay these energy offset charges. Moreover, to the extent that virtual bidding on inter-ties might lower day-ahead prices under some conditions, this would represent a transfer of payments from owners of physical generation within the ISO (who receive lower day-ahead prices) to the traders and financial entities that are receiving most of the profits being paid out for convergence bidding. Such a transfer of payments would be contrary to efforts to promote retention of existing gas-fired generation capacity within the ISO.

- **Scheduling of renewable imports**. Some entities profiting from convergence bidding have argued that virtual bidding on interties will promote import of resources with variable output or availability (such as renewable wind resources). With convergence bidding, entities seeking to import such resources could schedule their day-ahead forecast of expected output as virtual supply. Prior to the hour-ahead market, they could purchase transmission as needed based on updated forecast of available supply. The resource owner could then schedule expected output of the resource as a physical schedule in the hour-ahead market. This would allow the entity to earn the day-ahead price for most of its output, but avoid purchasing excess transmission in the event its day-ahead forecast of supply exceeds its hour-ahead

[4] More detailed explanations of this conclusion are also provided in Management's memo and the Market Surveillance Committee opinion on this topic.

forecast. However, under this scenario, a renewable resource could achieve the same financial outcome by scheduling its day-ahead forecast of supply as a physical import in the day-ahead market. The resource owner can then simply adjust its physical import schedule in the hour-ahead market based on its updated forecast of available supply and purchase the amount of transmission needed to meet this updated schedule. DMM has discussed this scenario with numerous participants to confirm that both these approaches are financially equivalent, and that virtual bidding is not needed to facilitate imports of renewable or other resources with variable output. Analysis by DMM and discussion with stakeholders also indicate this practice is not being used at this time to facilitate imports of renewable or intermittent generation.

- **Hedging physical imports through virtual exports.** An entity seeking to import generation could theoretically use virtual exports to partial hedge against the price risk they face if they cannot deliver supply scheduled in the day-ahead market as the result of a generation or transmission outage occurring prior to the hour-ahead market. Under this scenario, a supplier would need to reduce their day-ahead schedule in the hour-ahead market and be charged for this reduction at the hour-ahead market price. By scheduling virtual exports in the day-ahead market, a supplier could hedge any financial risk that the hour-ahead price paid for such reductions and would be higher than the day-ahead price received for energy scheduled day-ahead market. Analysis by DMM indicates that any use of virtual bidding on interties for this type of hedging is de minimus at most.[5]

Additional steps

There is a growing consensus between the ISO and many stakeholders that the best long-term solution to increasing the efficiency of the hour-ahead and real-time markets and reducing imbalance offset charges is to fundmentally redesign of how external and internal resources are scheduled and settled. However, the implementation of such a redesign is likely to take several years and may need to be coordinated with changes in current practices for scheduling intertie transactions throughout the west. In the meantime, even without virtual bidding at the interties, the real-time energy imbalance uplift may still be significant. DMM therefore recommends that the ISO continue to pursue other steps that can be taken to reduce these charges.

In particular, DMM recommends that the ISO continue to consider implementing the type of rules employed in the New York ISO's real-time method for settling intertie schedules. With this approach, the ISO would continue to dispatch additional imports or exports in the hour-ahead process that were projected to be economic based on their bid prices. However, with this approach:

- Any additional exports or decrease in imports would be treated as *price-takers* and charged the hourly average of prices in the 5-minute real-time market. This would eliminate the significant

[5] While day-ahead physical imports average over 7,000 MW per hour, an average of only about 11 MW per hour of virtual demand is scheduled by entities with cleared day-ahead physical imports at the same intertie. Even if all 11 MWs an hour were intended to hedge a potential outage, the total value of this hedge would be de minimus compared to the direct cost of virtual bidding on the real-time imbalance energy offset charge.

impact that reductions in day-ahead physical import schedules have had on real-time energy imbalance offset charges.

- Any increase in imports or decrease in exports in the hour-ahead process would be paid the higher of their bid or the 5-minute real-time market price or their bid. This would provide a bid price guarantee for any additional imports scheduled to meet ISO load in the hour-ahead process. Historical market data indicate that bid cost recovery payments of increased imports would be very limited under this approach. However, this approach would retain the ISO's ability to attract enough additional net imports in the hour-ahead market to ensure reliability when needed.

FLEXIBLE RAMPING CONSTRAINT

The ISO is proposing to implement a new flexible ramping constraint in the real-time market optimization to increase the amount of ramping capacity available in the 5-minute real-time market. This is one of several key software enhancements the ISO hopes may reduce the frequency and severity of price spikes in the 5-minute real-time market caused by very short and often minor deficiencies of upward ramping capacity. As noted in prior DMM reports, these price spikes generally reflect forecasting and modeling limitations, rather than fundamental underlying supply conditions. However, these price spikes account for most of the divergence between prices in the 5-minute market and prices in the day-ahead and hour-ahead markets.

In theory, the flexible ramping constraint could be set so that is binding and therefore has an impact on market dispatches and prices when it is most needed to prevent false scarcity conditions. This would result in pricing this service during a relatively small percentage of time intervals. As noted in DMM's recent quarterly reports, shortages of upward ramping capacity occur during less than 1 percent of market intervals and most of these shortages have lasted only one or two 5-minute intervals.[6] The ISO believes that this new flexible ramping constraint is likely to be effective in mitigating price spikes caused by these short term shortages of ramping capacity, without having a more significant impact on market prices and costs.

In practice, DMM notes that to mitigate these extreme price spikes, this new ramping constraint may need to be set so that it is binding more frequently and therefore impacts market dispatches and prices during a much larger percentage of intervals. Thus, the costs and benefits of this new market feature need to be carefully monitored by the ISO and managed by adjusting the specific details of this constraint.

The ISO has performed a limited number of simulations which suggest this new constraint will be effective at increasing ramping capacity at a reasonably low cost. The actual costs and benefits of this new constraint may vary significantly under actual operating conditions. DMM notes that assessing the impact of this new constraint cannot be done directly on market results and will require that the ISO develop special algorithms to estimate the impact this constraint may have had on market outcomes and/or perform special market re-simulations with this constraint removed from the market model.

[6] For example, see DMM's *Quarterly Report on Market Issues and Performance*, February 8, 2011, pp.13-15, http://www.caiso.com/2b1f/2b1f838819910.pdf.

DMM has offered the following recommendations regarding further potential design enhancements and issues the ISO should prepare to monitor and respond to once the feature is implemented:

- ***Calculated ramping requirement.*** The ISO should explicitly specify the calculation for determining the flexible ramping requirement that will be applied in the real-time pre-dispatch performed every15-minutes.
- ***Manual adjustments.*** Grid operators will have the opportunity to adjust the calculated requirement that could have significant impacts on market outcomes. The ISO should have procedures in place for determining an appropriate adjustment, record such adjustments separately from the calculated requirement, and require logging of the purpose for the adjustment.
- ***Monitoring overall performance and impacts.*** The ISO should develop monitoring metrics for the following areas and report on these issues:
    - *Overall market impact:* Has the flexible ramping constraint reduced the frequency of instances where the imbalance dispatch and pricing show scarcity of ramping capacity?
    - *Impact on resource dispatch:* To what extent is the flexible ramping constraint committing additional short-start resources or reserving capacity from those already online?
    - *Impact on energy prices in constrained areas:* Is the flexible ramping constraint procuring from online resources in constrained areas and alleviating system ramping constraints at the expense of exacerbating higher local prices in these areas?
- ***Pricing.*** The ISO is proposing a pricing model that potentially includes both the opportunity cost of energy and the opportunity cost of not selling ancillary services in the 15-minute pre-dispatch process. However, capacity reserved for the flexible ramping constraint in the 15-minute pre-dispatch process can then be dispatched to provide energy in the 5-minute dispatch. If this occurs frequently, the price paid to resources providing ramping capacity based on their opportunity cost in the 15-minute pre-dispatch may exceed their actual opportunity cost in the 5-minute real-time market. DMM recommends the ISO review this issue after this new market feature is implemented to consider the appropriateness of pricing paid to resources providing ramping capacity relative to these resources actual opportunity costs.
- ***Bid cost recovery.*** Resources providing flexible ramping capacity are eligible to receive a payment for providing that service. The ISO proposal does not propose to include these revenues in the bid-cost recovery calculations. Since these payments do contribute to the daily profitability of resources, DMM believes these revenues should be included in the bid-cost recovery calculations as a matter of principle. The ISO has indicated this modification would introduce additional complexity to the implementation of this feature. If overall revenues from this new constraint are reasonably low, as expected by the ISO, this should not be a significant issue.

- ***Resource performance.*** Resources will be paid for a service as a result of the flexible ramping constraint. The ISO should monitor the extent to which resources paid for reservations from the flexible ramping constraint are called upon in the 5-minute dispatch and provide energy consistent with their dispatch into the reservation. The ISO should consider rescinding payment for resources that do not perform, as is done with ancillary services. The ISO has indicated this modification would introduce additional complexity to the implementation of this feature.

Based on this analysis, the ISO should be prepared to adjust aspects of this new constraint as necessary to ensure that the benefits exceed the cost of this new constraint. Most importantly, the ISO should be prepared to quickly adjust the quantity of ramping capacity required by this constraint as needed to ensure the cost-effectiveness of this constraint.

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon all of the parties listed on the official service list for the above-referenced proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Washington, D.C. this 27th day of October, 2011.

/s/ Bradley R. Miliauskas
Bradley R. Miliauskas