

Memorandum

To: ISO Board of Governors
From: Keith Casey, Director, Market Monitoring
Date: October 9, 2007
Re: *Market Monitoring Report*

This is a status report only. No Board action is required.

This month's DMM Board Memo provides a brief summary of two issues:

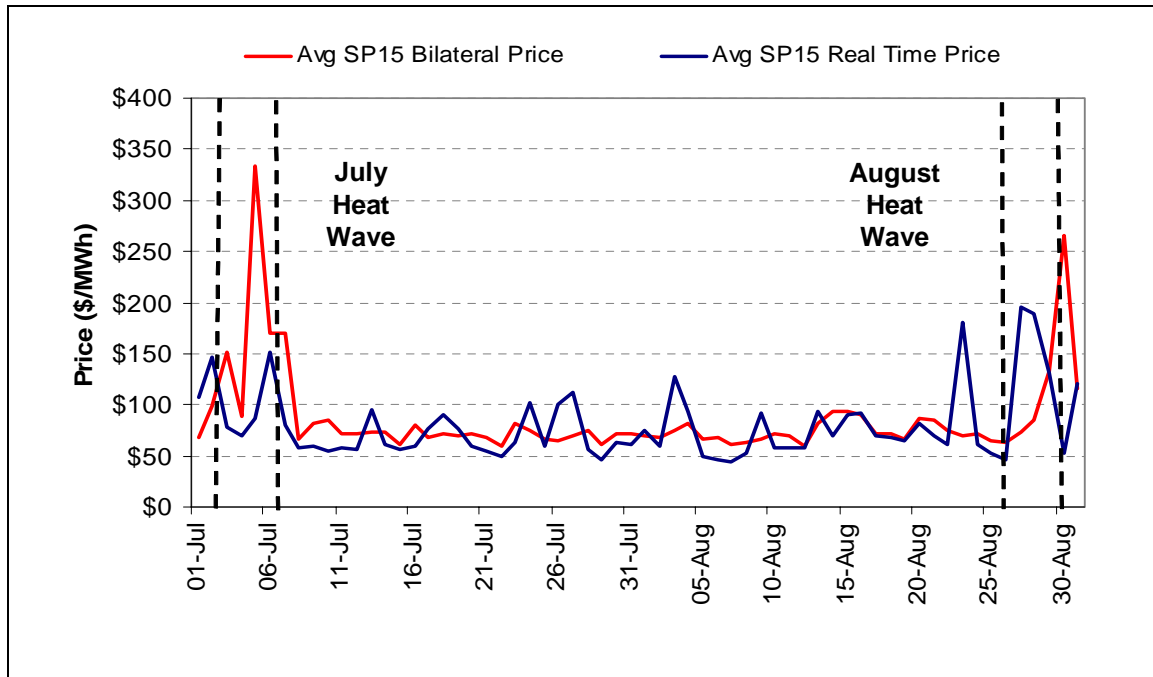
1. **Summer 2007 Market Performance** – A brief summary of market performance highlighting some of the critical drivers affecting overall market performance. Despite a relatively low supply of hydroelectric energy, energy and ancillary service prices were generally moderate over much of the summer due in large part to relatively moderate demand conditions.
2. **Generator Forced Outage Reporting Compliance** – Beginning on July 1, 2007, the Department of Market Monitoring (DMM) began enforcing penalties for late reporting of generator forced outages. Since then, there has been a marked decline in the number of late forced outage reports. Greater compliance with these requirements improves grid reliability by giving operators more accurate and timely information on the status of the generation fleet. DMM is highlighting this issue to the Board because it demonstrates how a well-designed and implemented penalty provision can significantly improve compliance with the CAISO Tariff.

I. Summer 2007 Market Performance

Overall Market Performance

Mild temperatures and loads throughout the summer translated into moderate spot and real-time energy prices, with the exception of two heat waves, one in early July and the second in late August. Figure 1 shows average spot bilateral prices and average real-time prices, averaged across the super-peak hours (hours 12-18) for July through mid-September. Throughout this period, spot bilateral prices and real-time prices for Southern California (SP15) track together fairly closely, and both exhibit increased volatility and spikes during the heat wave periods.

**Figure 1. Average Prices for Energy for Super-Peak Hours
July 1 – September 15, 2007**

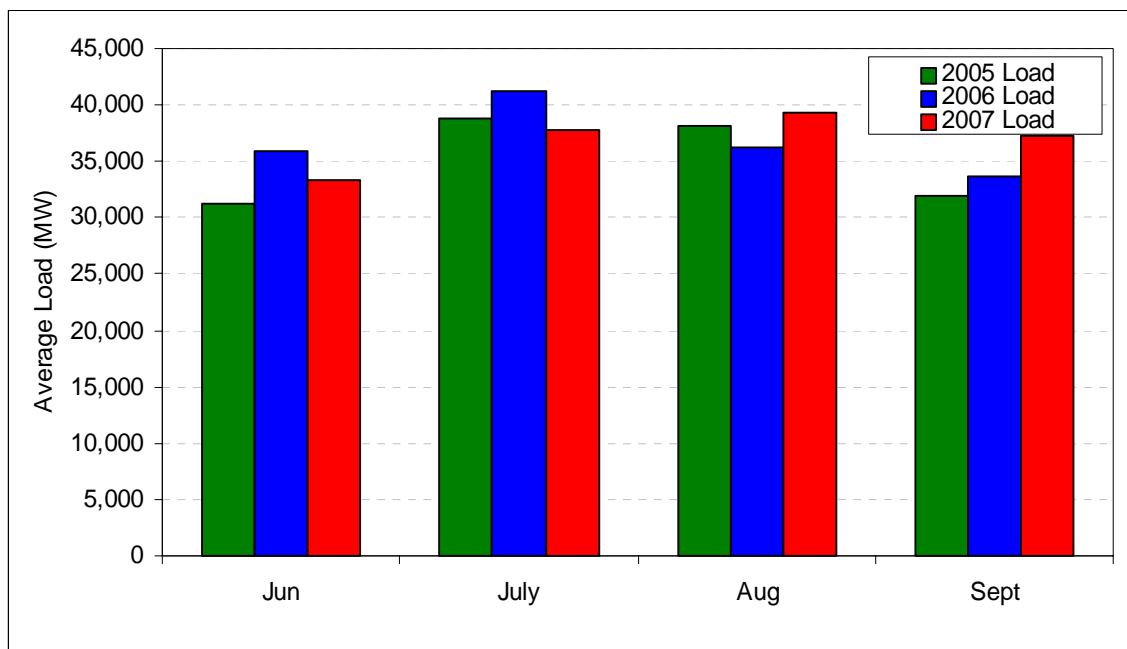


A brief review of some of the critical drivers of market performance this past summer is provided below.

Demand Conditions

Summer load levels were mild in 2007 compared to 2006. Generally, it is the peak load hours that are of primary concern to the CAISO for reliability purposes and it is also these hours where markets can be impacted the most. Figure 2 below shows monthly comparisons of average hourly load across the super-peak hours (hours ending 12 – 18). Average loads during the super-peak period were lower in June and July of 2007 compared to 2006. Super-peak loads in 2006 were above average due to generally warmer temperatures and one small heat wave. In 2007, June weather was mild resulting in lower average loads across all hours. In July 2006 California experienced measurably higher temperatures on average with one significant heat wave the week of the 24th that increased loads significantly. July 2007 temperatures and loads were mild in comparison, with one mild heat wave the week of July 4th. The impact of this short heat wave on loads was tempered by the Independence Day holiday which occurred in the middle of the week. Milder temperatures in July 2007 resulted in average super-peak loads that were roughly 3,000 MW lower than July 2006. Average loads during the super-peak hours in August and the first half of September of this year were higher compared with the last two years. However, extreme peak days during this period were limited, with only one period of high loads in late August and early September. The peak load of the year was 48,477 MW and occurred during the late August heat spell on August 29th.

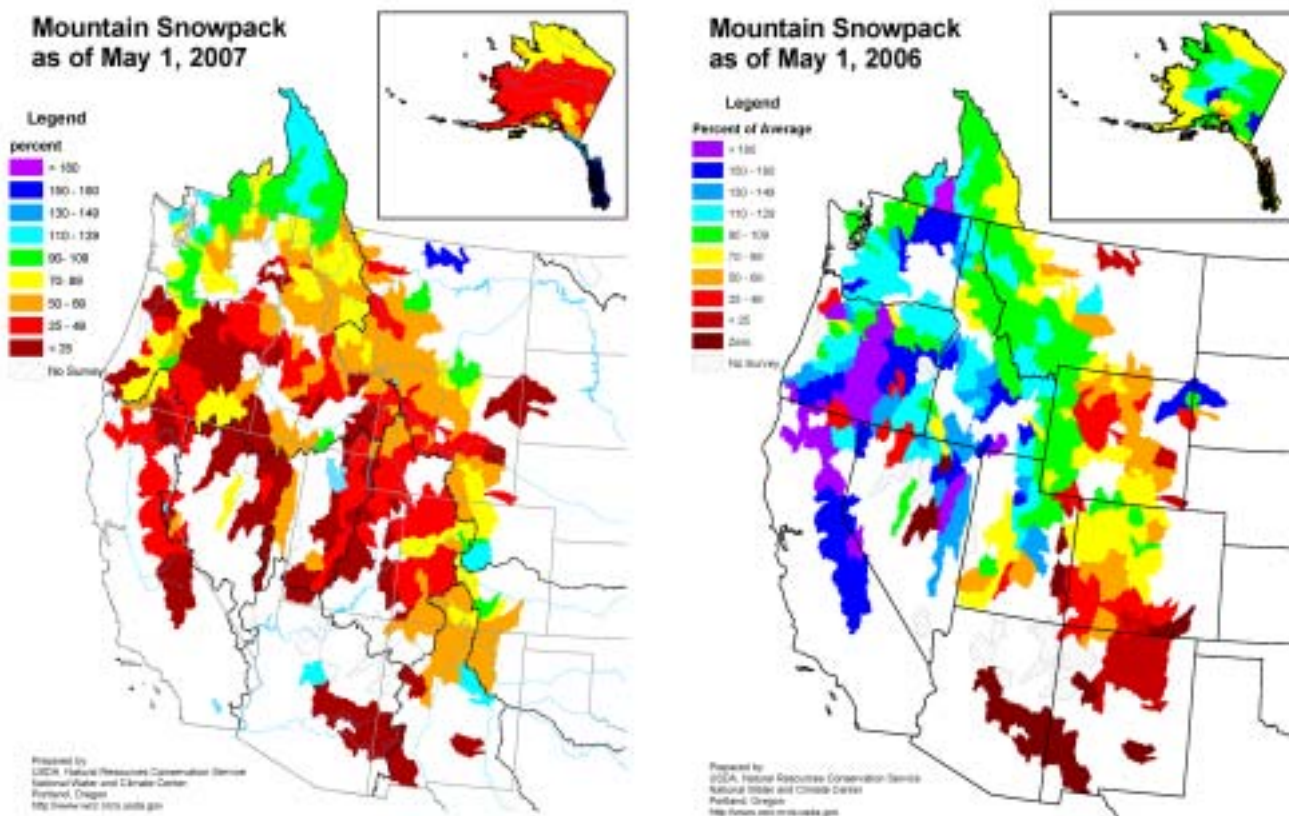
Figure 2. Average Hourly Load During Super-peak Hours (HE 12 – 18) for June 1 – September 15



Supply Conditions

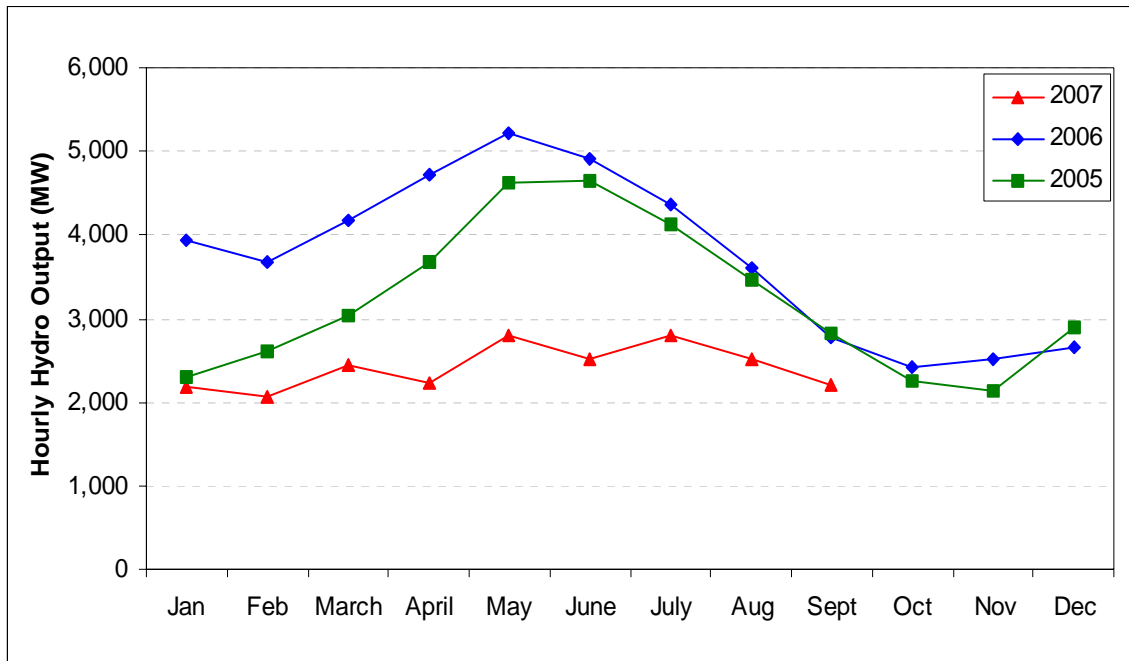
The mild temperatures and resulting load observed this summer helped to mitigate potential market and reliability issues that could have resulted from an extremely low hydroelectric production year. California is highly dependent upon imports and hydroelectric generation from within the state and much of the energy imported from the Pacific Northwest is also hydro-based. Precipitation and snow pack levels in California and much of the Pacific Northwest in 2007 were at below-normal levels in 2007 (Figure 3).

Figure 3. Comparison of 2006 and 2007 Snowpack as Measured on May 1



The low snowpack levels for 2007 shown in Figure 3 resulted in very low hydroelectric output. Figure 4 compares average hourly hydroelectric output by month for the past three years and shows a dramatic decline in average hourly output levels in 2007, relative to 2005 and 2006. Hydroelectric production in 2007 was low at the beginning of the winter season and remained relatively flat throughout the spring and summer, never showing the late spring run-off peak as seen in the prior two years (Figure 4).

Figure 4. Average Hourly Hydroelectric Output by Month for 2005 - 2007



Another important impact of low hydroelectric production is the impact on available Resource Adequacy (RA) capacity. Resource Adequacy was first implemented in 2006 and requires that Load-Serving Entities make a showing of procured capacity that is not less than 115% of monthly (forecast) peak load. In 2007, roughly 4,500 MW of hydroelectric capacity was counted toward RA requirements, which is about 8% of the total system-wide RA requirement. In low hydro years, it is possible that not all of the capacity from hydro resources that is counted toward meeting RA requirements will be available to meet load during peak hours.

**Figure 5. Peak Hour RA Capacity and Availability from Hydroelectric Units
June – August, 2007**

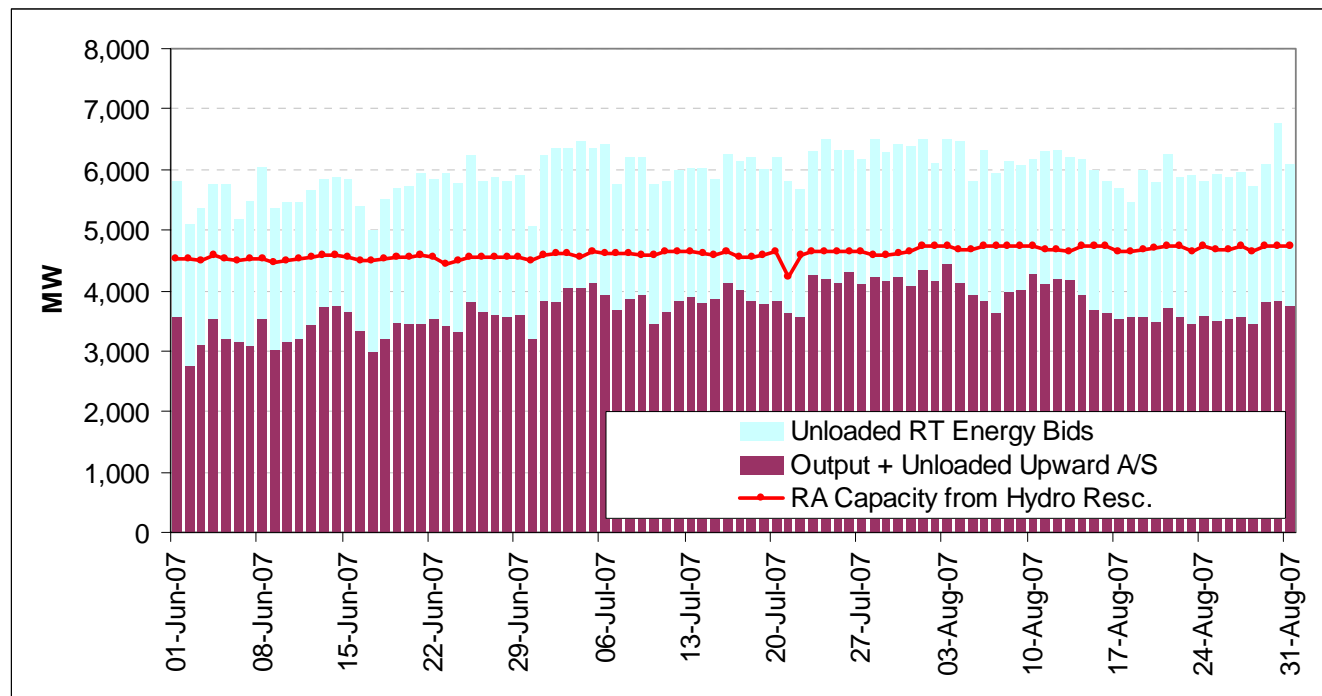


Figure 5 compares the total designated RA capacity of hydro resources (red line) for the peak hour of each day to the resources' estimated actual availability (purple and light blue columns). The actual total availability of the RA hydro resources is measured as their actual energy output and unloaded Ancillary Service capacity (purple column) plus non-dispatched energy bids for the real-time market (light blue column).

For 2007, the amount of designated RA capacity from hydroelectric resources was roughly 4,500 MW throughout the peak summer months. The amount of hydro capacity that can be counted as RA capacity is based in part on a 1-in-5 dry hydro scenario (i.e., the hydro conditions we expect to see only once in five years).¹ As evident in Figure 5, not all available RA-hydro capacity was scheduled or dispatched on any given peak-load hour in summer 2007. However, on more extreme peak hours one would expect nearly all available capacity to be either scheduled, dispatched, or held in reserve as Ancillary Services. As seen in Figure 5, during this period actual output and operating reserves from this pool of resources was generally between 3,000 MW and 4,000 MW (purple columns). There was an additional amount of capacity from these resources bid into the imbalance market that exceeded the stated RA capacity (light blue columns in Figure 5). However, due to the energy-limited nature of these resources, this additional bid-in hydro capacity may not all have been available during successive peak-load hours on high load days due to low reservoir levels.

Although using a one-in-five low hydro scenario is a fairly conservative approach to counting hydro capacity, one potential concern is that if California experiences successive low-hydro years, the actual available capacity from hydroelectric resources may dip measurably below the amount of capacity that is allowed to count toward meeting RA requirements under these rules. This may hold true for any individual peak-load hour or more likely for sustained production across a block of super-peak hours. Should California experience another low snowpack season this winter, the CAISO and CPUC staff should consider reviewing the RA hydro counting rules to ensure

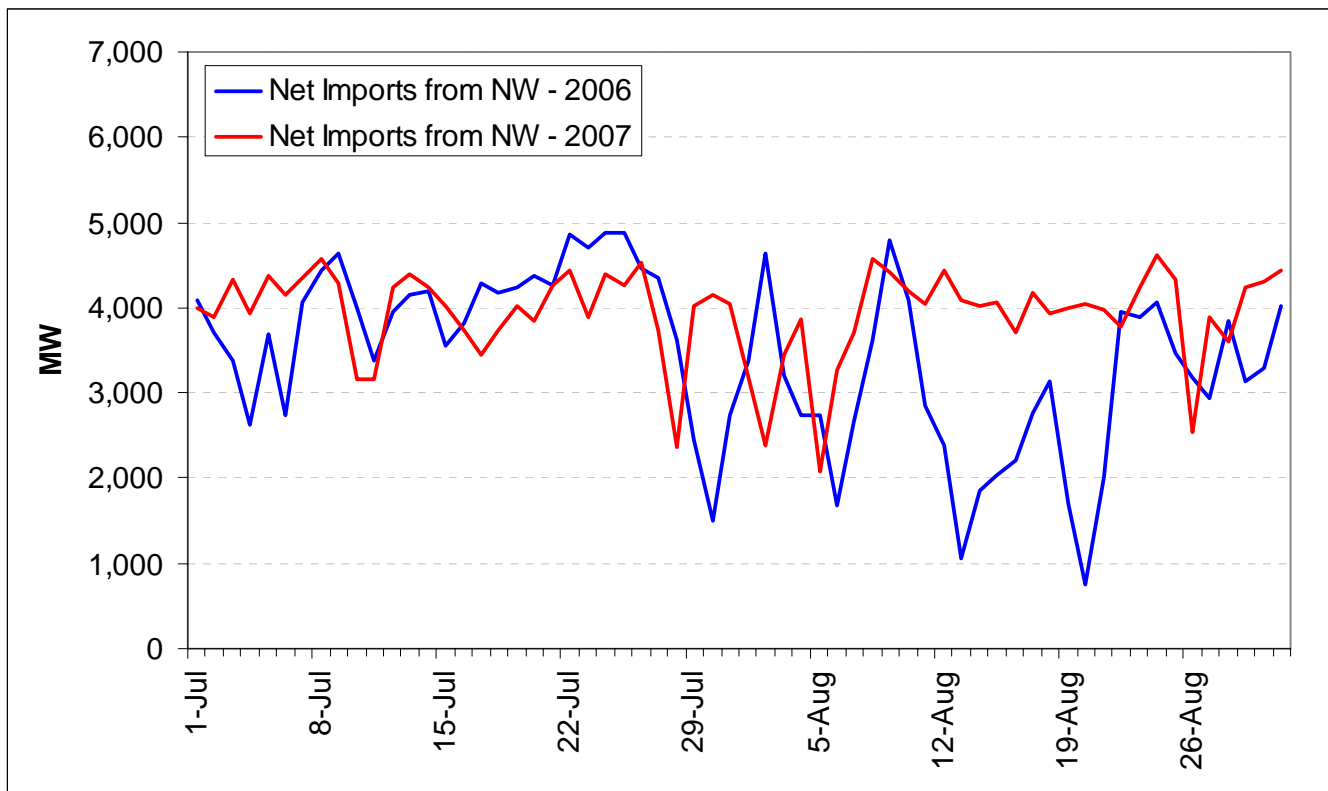
¹ For a more detailed description of the RA capacity counting rules, see "Workshop Report on Resource Adequacy Issues" published by the CPUC on June 15, 2004 (CPUC Rulemaking No. 01-10-024 and 04-04-003).

that limitations in hydroelectric production resulting from successive low hydro years are adequately reflected in the final RA capacity levels.

Limited supply from in-state hydroelectric resources in 2007 resulted in a greater dependence on non-hydro generation within the CAISO Control Area. Similar to the past two years, generating units within the CAISO Control Area maintained a high level of availability throughout the summer months. The average generation forced outage rate for CAISO Control Area during the peak-load hour of the summer was roughly 4%.

The low snowpack levels in 2007 throughout the Pacific Northwest were also expected to have an impact on import levels to the CAISO Control Area from that region. Figure 6 compares net imports (Day Ahead, Hour Ahead, and Real Time) from the Pacific Northwest for the peak-load hour of each day in summer 2007 to last year's level (2006 was a high-hydro year in the Pacific Northwest and California). Net import levels from the Pacific Northwest on the peak-load hours of July and August were comparable to those seen in 2006, and even higher on average in mid-August. The higher than expected 2007 import levels from this region may have been due in part to higher hydro availability in British Columbia, which unlike the rest of the West had an above normal snowpack level in 2007. Another unexpected pattern observed in summer imports was a slight decline in net imports from the Southwest compared to 2006. This change in Southwest imports is not directly related to the difference in hydro availability between 2006 and 2007.

Figure 6. Peak Hour Net Imports from the Pacific Northwest for July and August 2006 and 2007



Summary

Overall, the CAISO Real Time Market performed well during the summer with generally competitive prices that were well correlated with spot bilateral electricity prices. While limited hydroelectric capacity was a concern going into the summer, neither market outcomes nor grid reliability were significantly impacted by the reduced hydro availability. In addition, imports from the Pacific Northwest remained comparable to levels observed in 2006 when hydro conditions were much better. With the potential of successive low-hydro years going forward, the amount of hydroelectric capacity that is counted toward meeting the Resource Adequacy requirement should be reviewed to ensure the RA capacity designations for these resources are consistent with their actual capability.

II. Compliance with Generation Forced Outage Reporting

Summary

Beginning in July 2007, DMM began to enforce penalties for two key generation outage reporting requirements incorporated in the CAISO Tariff:

- **Forced Outage Reporting within 30 Minutes.** Forced outages of generating units must initially be reported within 30 minutes from the time outages are discovered. Sanctions for non-compliance with this requirement start with a warning letter, and then escalate up to \$5,000 per outage with each additional violation for each unit within each 12 month period.
- **Forced Outage Explanations within Two Days.** Generators must also provide a follow-up explanation of forced outages within two working days. The penalty for not providing a follow-up explanation of a forced outage within two days is \$500 per day the explanation is late.

These requirements and associated penalties were included in the CAISO Tariff because timely and accurate information on unit availability was deemed to be critical for reliable operation of the grid. Implementation of penalties for non-compliance with these requirements on July 1, 2007 has coincided with marked improvement in market participants' compliance with the forced outage reporting requirements. The significant improvement in compliance likely contributed to reliable grid operations during the critical peak summer months as it gave operators more accurate and timely information on the status of the generation fleet. Implementing penalties requires significant initial effort to work out various implementation details and to ensure CAISO systems provide a reasonable means for market participants to comply with the requirements. Experience to date indicates that the rollout of penalties for late generation outage reporting has been highly successful both from an implementation and compliance standpoint. Below is a brief summary of the efforts and processes DMM and other CAISO business units undertook to implement these requirements, and a review of the marked increase in compliance since the penalty provisions went into effect. This improvement shows that penalties, when structured and implemented correctly, can provide an effective incentive for market participants to comply with tariff requirements.

Background

Penalties for outage reporting requirements were initially established in 2004, as part of a major CAISO initiative to establish more specific rules of conduct and sanctions within the CAISO tariff. In late 2005, DMM assumed responsibility for enforcement of these provisions. However, when DMM initially proposed to begin enforcing penalties for the outage reporting requirements in July 2006, market participants expressed concern that various aspects of the requirements were either vague or unworkable. In addition, market participants contended that the

CAISO's software application used to report outages (SLIC) made it difficult to report all outages within the 30-minute requirement.

As a result, DMM recommended and the CAISO filed with FERC to temporarily suspend outage reporting penalties. The CAISO also initiated a stakeholder process to review and revise the outage reporting requirements. This filing was followed by a tariff amendment, submitted in October 2006, in which the CAISO slightly modified and clarified the outage reporting requirements. The CAISO also committed to making improvements to the SLIC application so that outage reporting did not pose an unreasonable burden on market participants. Penalties were suspended until July 1, 2007 to allow the CAISO time to make the needed improvements to the SLIC application and to allow market participants time to become familiar with the SLIC improvements and the revised reporting requirements.

Prior to the July 2007 effective date of penalties for not complying with the revised outage reporting requirements, DMM coordinated extensively with CAISO Operations, Legal, and External Affairs to ensure that market participants understood the requirements, and to resolve any ambiguities in the requirements. These efforts included:

- Published documentation on the CAISO website summarizing the requirements, responding to questions from participants, and detailing how to utilize improvements made in the SLIC outage reporting software.
- Multiple conference calls with market participants to provide participants an additional opportunity to clarify the requirements and raise concerns.
- Provision of weekly advisory reports to participants summarizing their compliance with the requirements, starting two months prior to the July 1 effective date for penalties.

Compliance with Outage Reporting Requirements

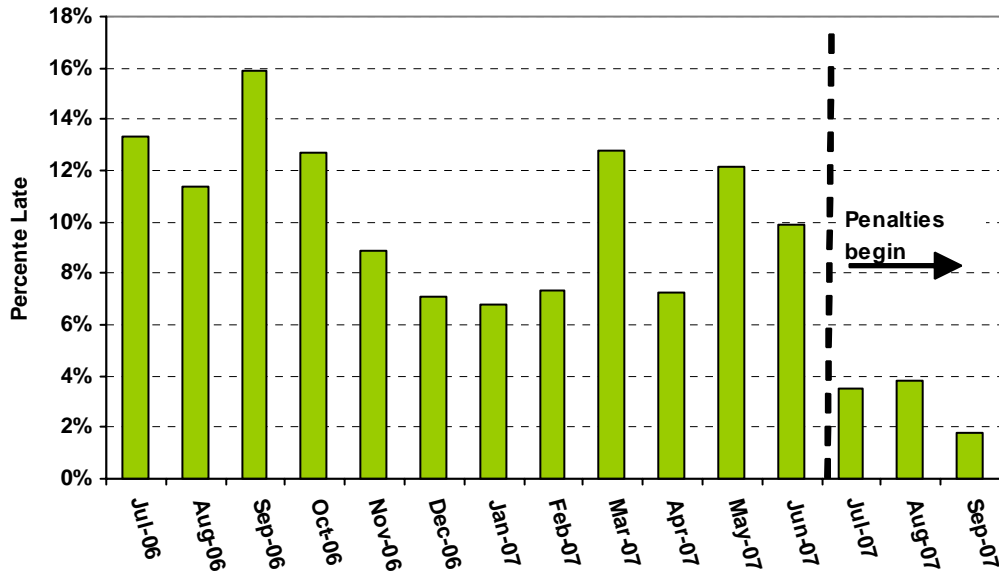
Compliance with the forced outage reporting requirements has improved significantly since the outage reporting penalties went into effect.²

- **Forced Outage Reporting within 30 Minutes.** As shown in Figure 1, in the months prior to July 2007, an average of about 8 to 12 percent of forced outages were not reported within the 30 minute requirement. Since then, less than 4 percent of forced outages were reported late in July and August, and less than 2 percent of forced outages were reported late in September. This translates to about 20 to 70 late reports of forced outages per month prior to penalties going into effect, compared with six late reports in September.³
- **Forced Outage Explanations within Two Days.** As shown in Figure 2, during the months prior to July 2007, market participants submitted forced outage explanations late (or did not submit the explanations at all) for about 30 to 40 percent of forced outages. After penalties went into effect, non-compliance with this two-day requirement dropped to around 1 percent by September. Also, while forced outage explanations were sometimes never provided prior to July, market participants have submitted explanations for all forced outages since penalties went into effect on July 1.

² In addition, it should be noted that all data on compliance with requirements since the time penalties were implemented is preliminary, since the enforcement process provides participants an opportunity to provide additional information that may indicate compliance with requirements. Thus, actual compliance rates can ultimately be somewhat lower than indicated by initial calculations upon which the enforcement process is initiated.

³ As of September 26.

**Figure 7. Potential Non-Compliance with 30-minute Outage Reporting Requirement
July 2006 through September 2007**



**Figure 8. Potential Non-Compliance with Two-day Outage Explanation Requirement
July 2006 through September 2007**

