



California ISO
Your Link to Power

Review of ISO Market Performance April – May, 2009

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Presentation focuses on two areas

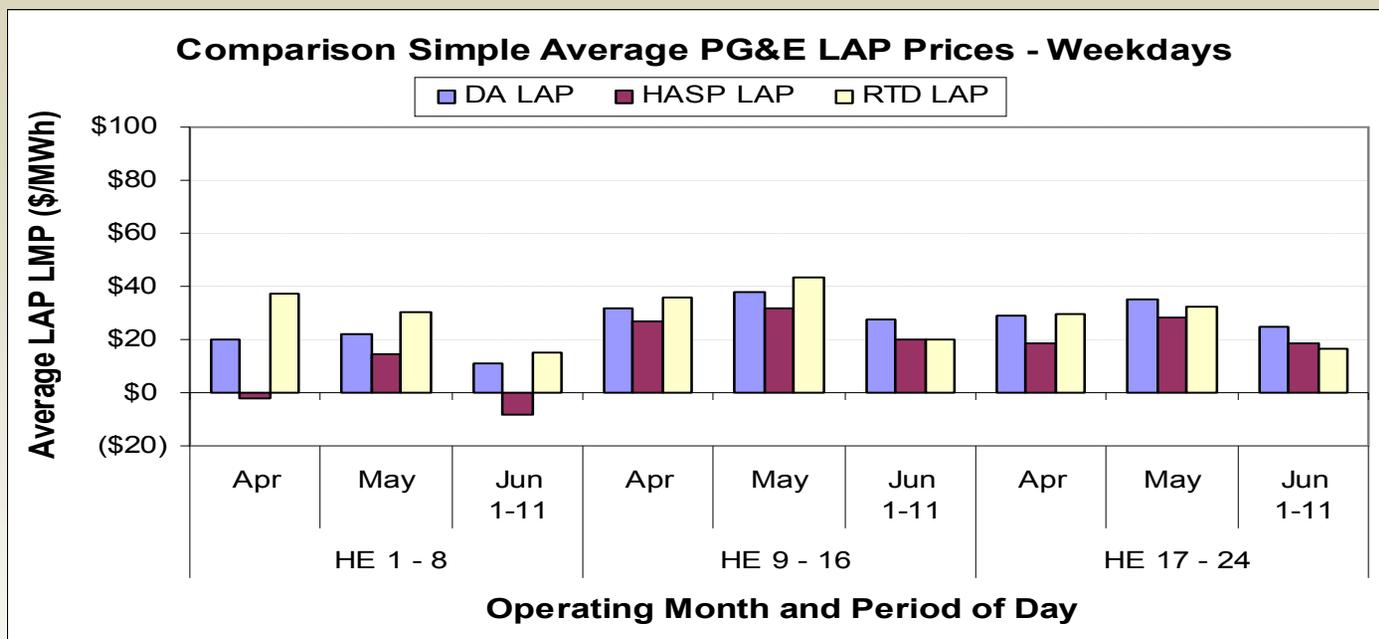
1. Trends in level of LAP price convergence between temporal energy markets

- Day Ahead
- HASP
- RTD

2. Trends in LAP price volatility

- HASP
- RTD

Trends in Price Convergence – PG&E LAP

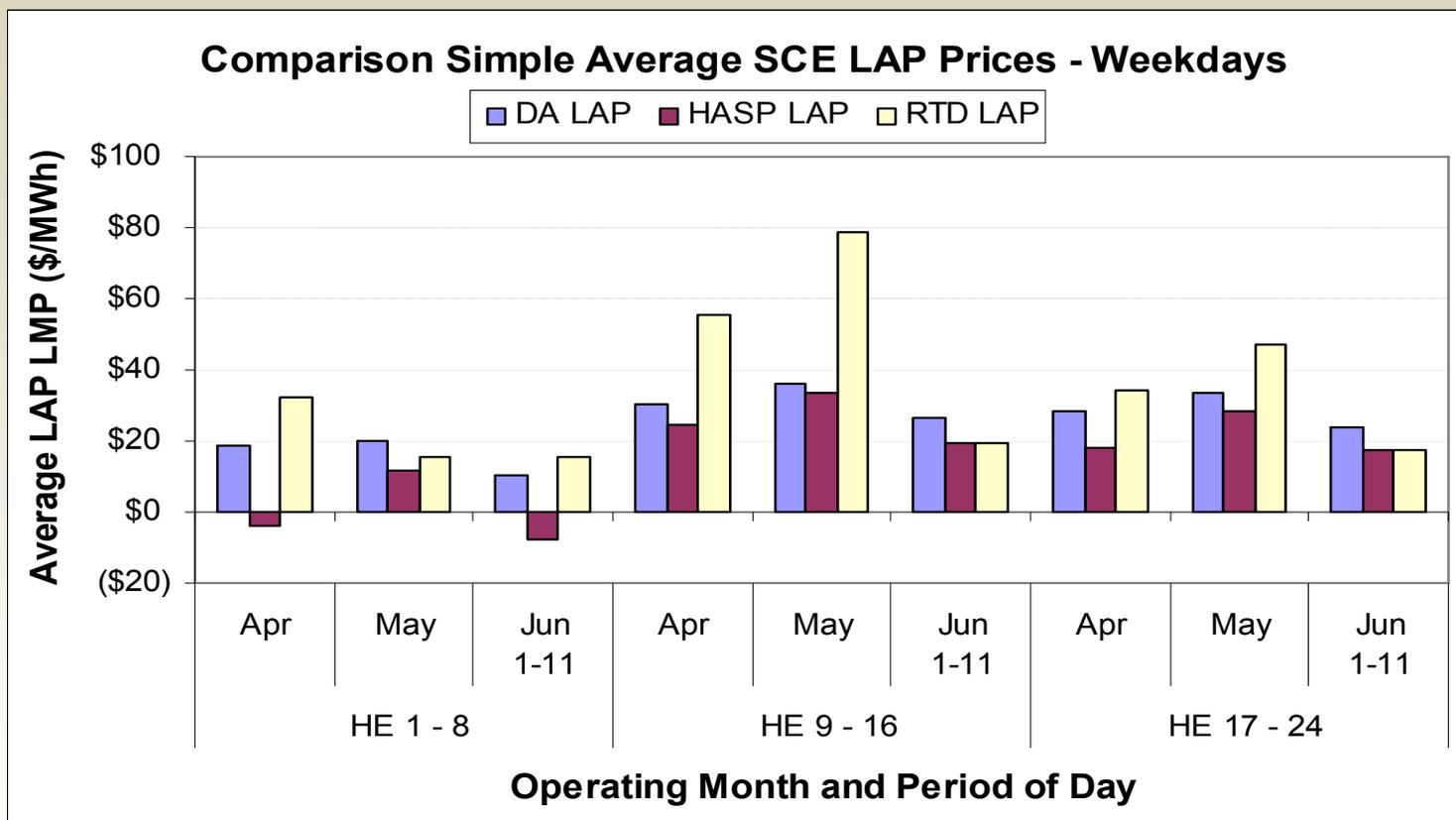


- RTD LAP Prices tend to higher on average across all time periods
- Morning Hours (1-8)
 - HASP-RTD price convergence improved in May but worsened in June
- Mid-Day (9-16) & Evening (17-24)
 - Better HASP-RTD Price Convergence in May & June

Potential Contributing Factors to Low HASP Prices during Morning Hours

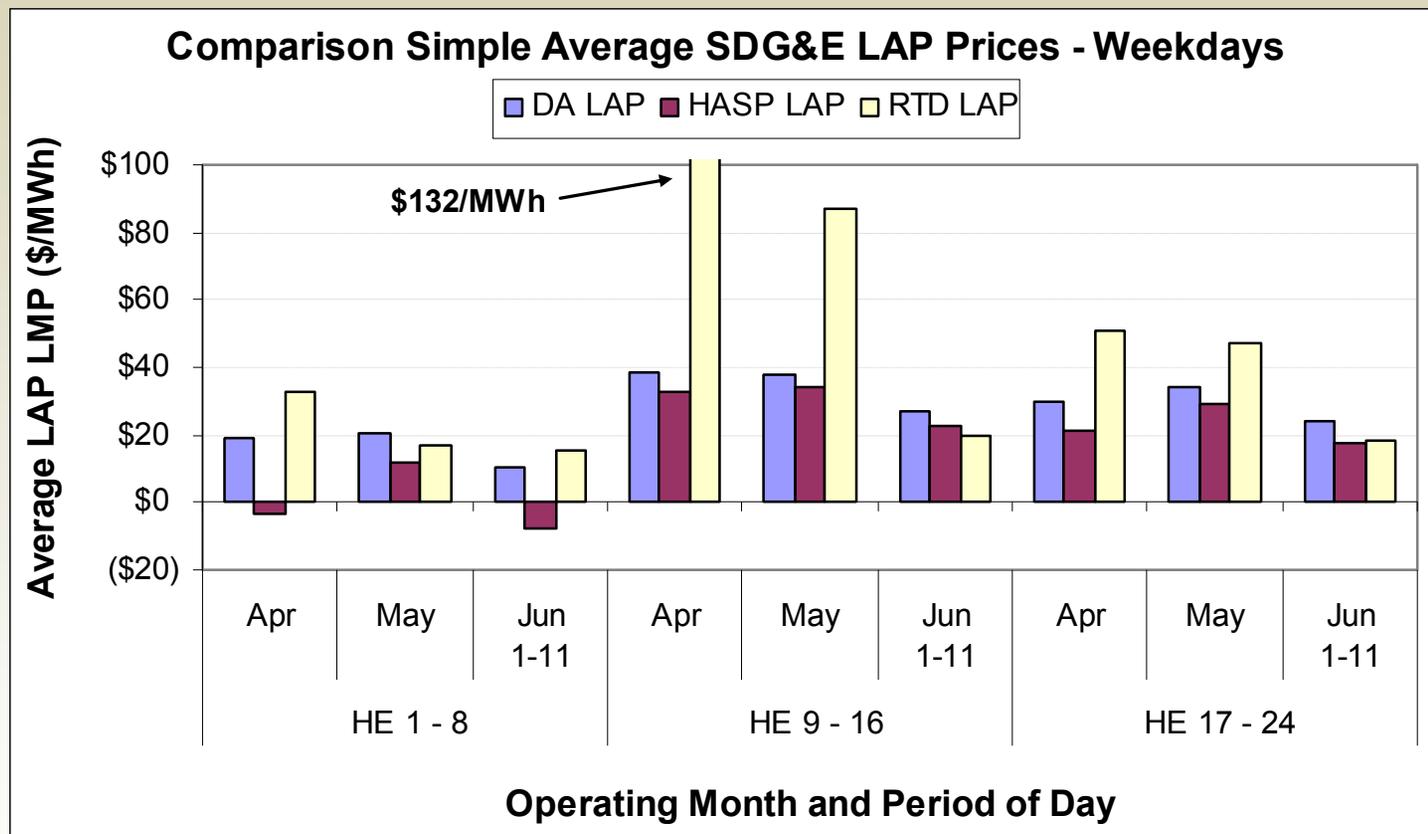
- Load typically scheduled in the DAM near 100%.
- RTPD load forecast used in HASP often significantly lower than RTD forecast and actual load.
- Failure to consider exports needed to cover losses in HASP software.

Trends in Price Convergence – SCE LAP



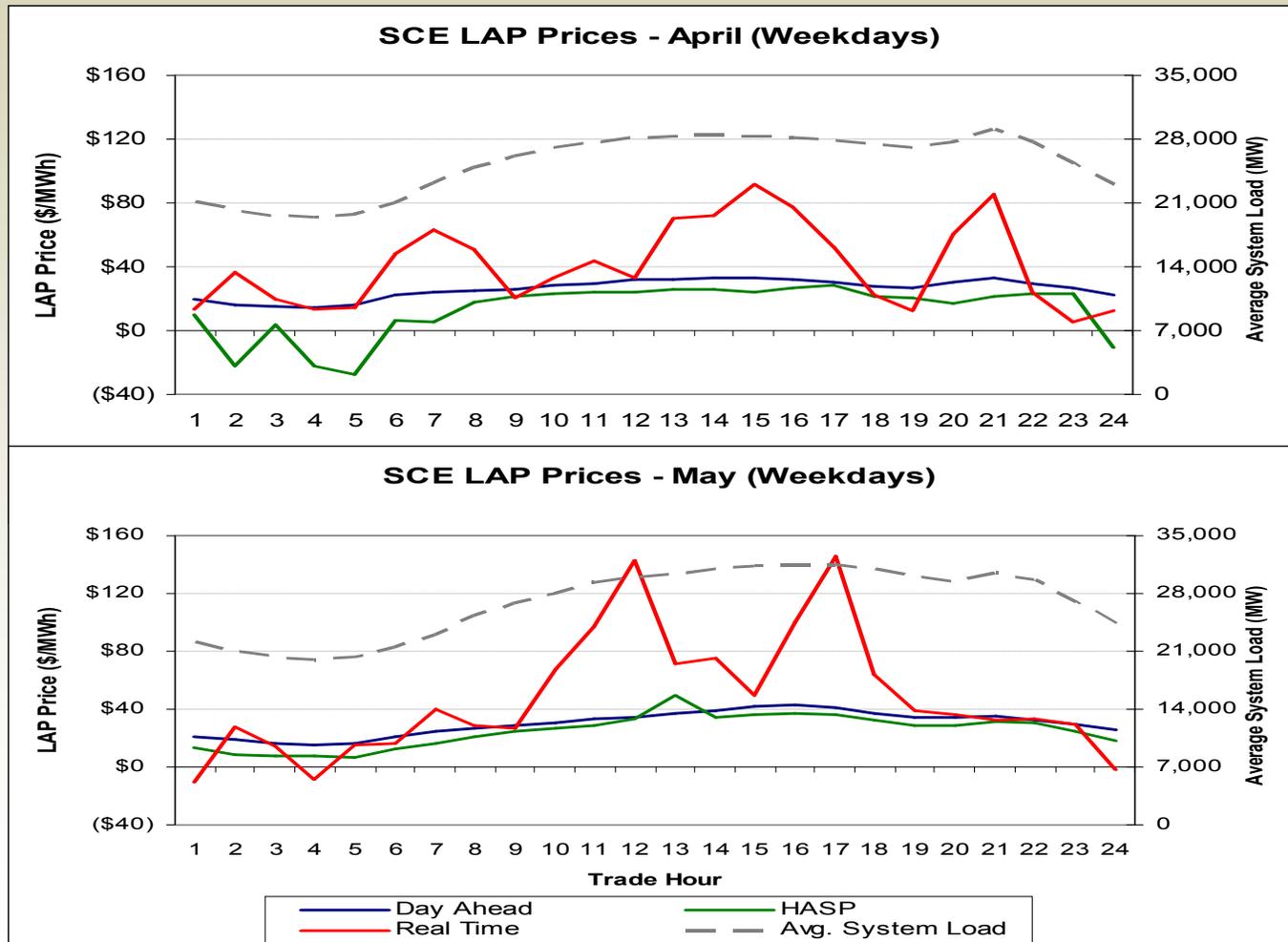
- Similar observations to PG&E LAP prices with higher April and May RTD prices.

Trends in Price Convergence – SDG&E LAP

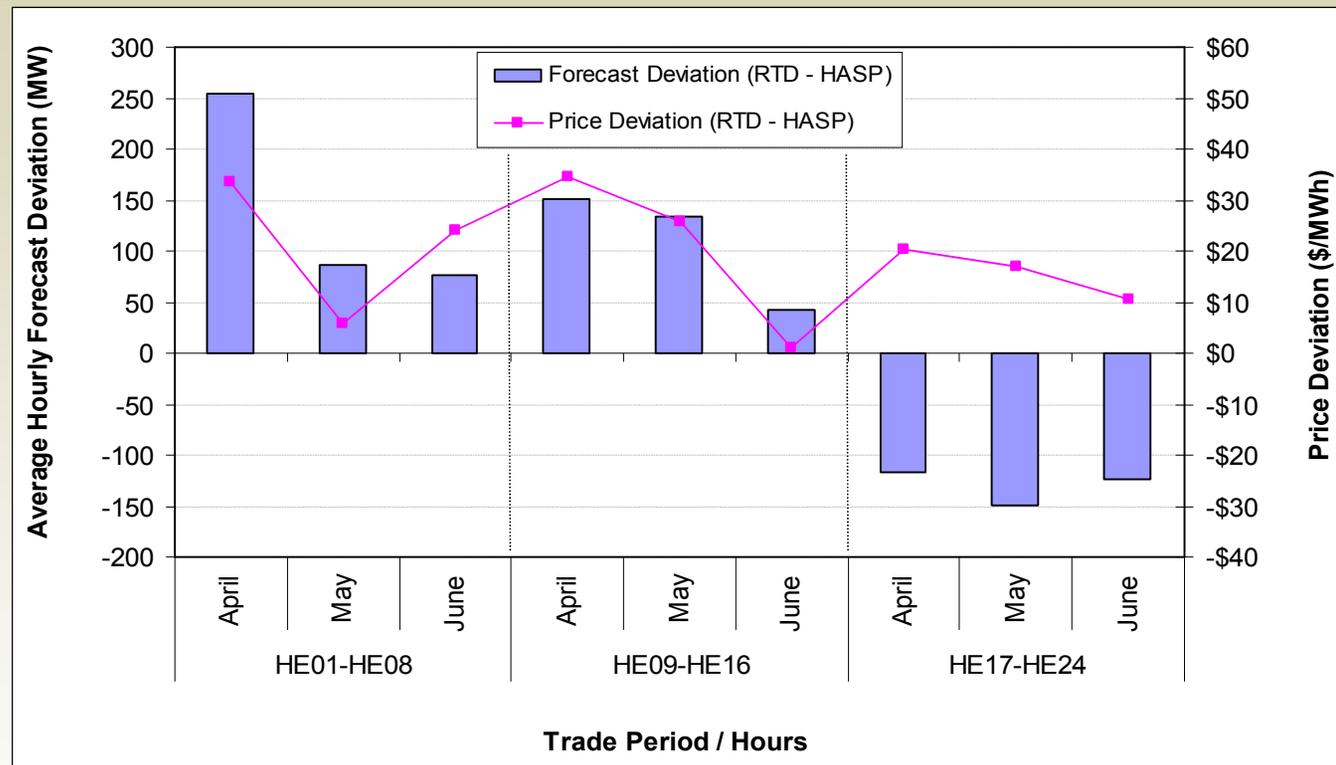


- Similar observations to PG&E LAP prices except for higher RTD LAP prices in April and May

Trends in Price Convergence - Comparison SCE LAP Prices (April & May)



Forecast and Price Deviation Between HASP and RTD (April 1 – June 11, weekdays only)



- RTD prices generally higher than HASP.
- Mid-day hours show strongest positive correlation
- Mid-day forecast and price deviation decline in early June.

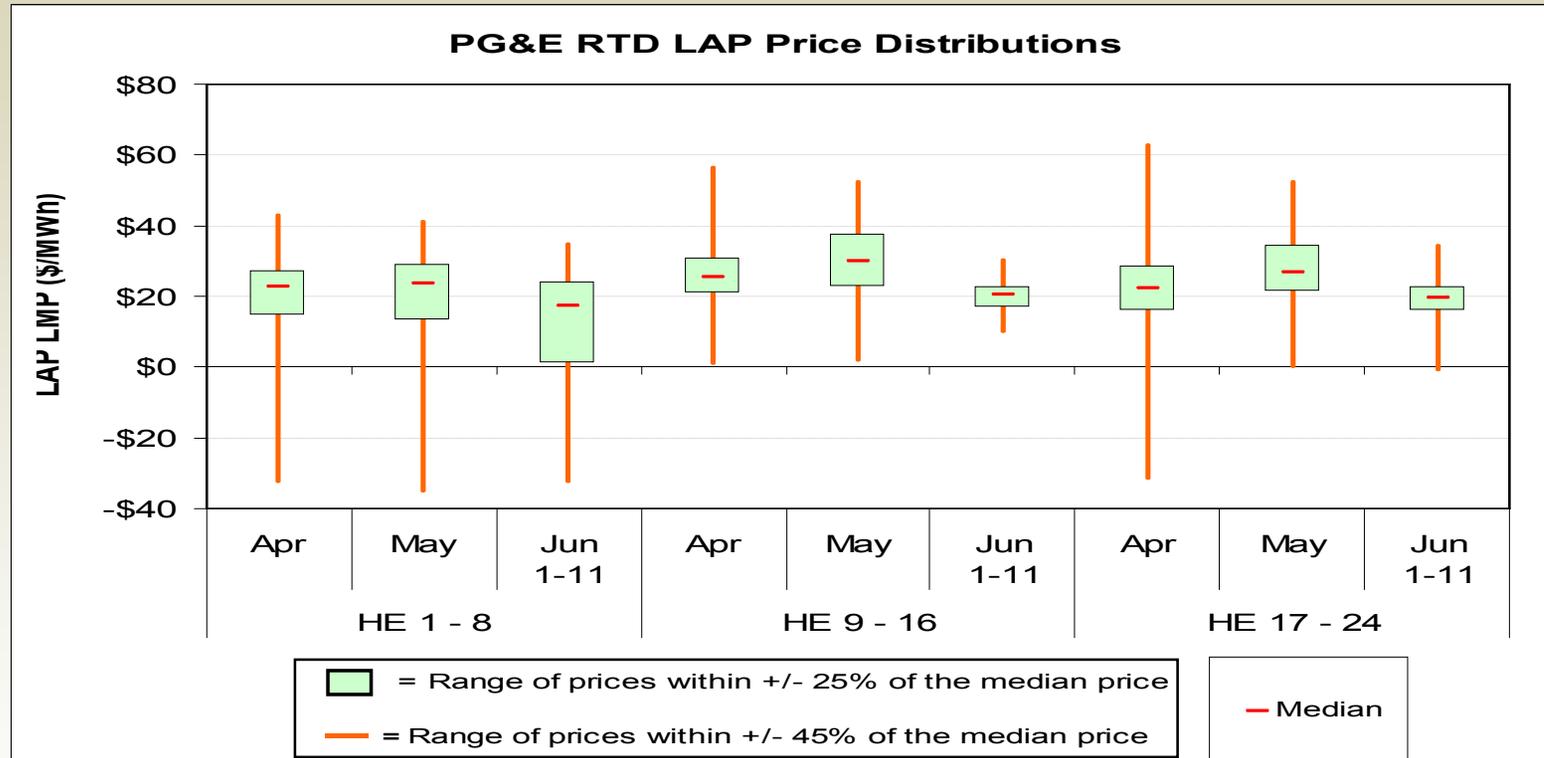
DMM Recommendations on Measures to Reduce Real Time Price Volatility – Modeling & Inputs

- Improve accuracy of Real Time Market Load Forecasts
 - Better consistency between RTPD and RTD load forecasts and forecast biasing
 - More accurate Load Distribution Factors (LDFs)
- Use of transmission limit biasing
 - Critical for reliable grid operation but
 - Can have significant market impacts
 - Should be used judiciously and closely monitored
 - Should be applied consistently in RTPD and RTD
- Generation availability
 - Significant amount of San Diego capacity awarded Regulation and Contingency reserves – not available for normal market energy dispatch.
 - Should consider options for releasing A/S in these situations.

DMM Recommendations on Measures to Reduce Real Time Price Volatility – Market Optimization

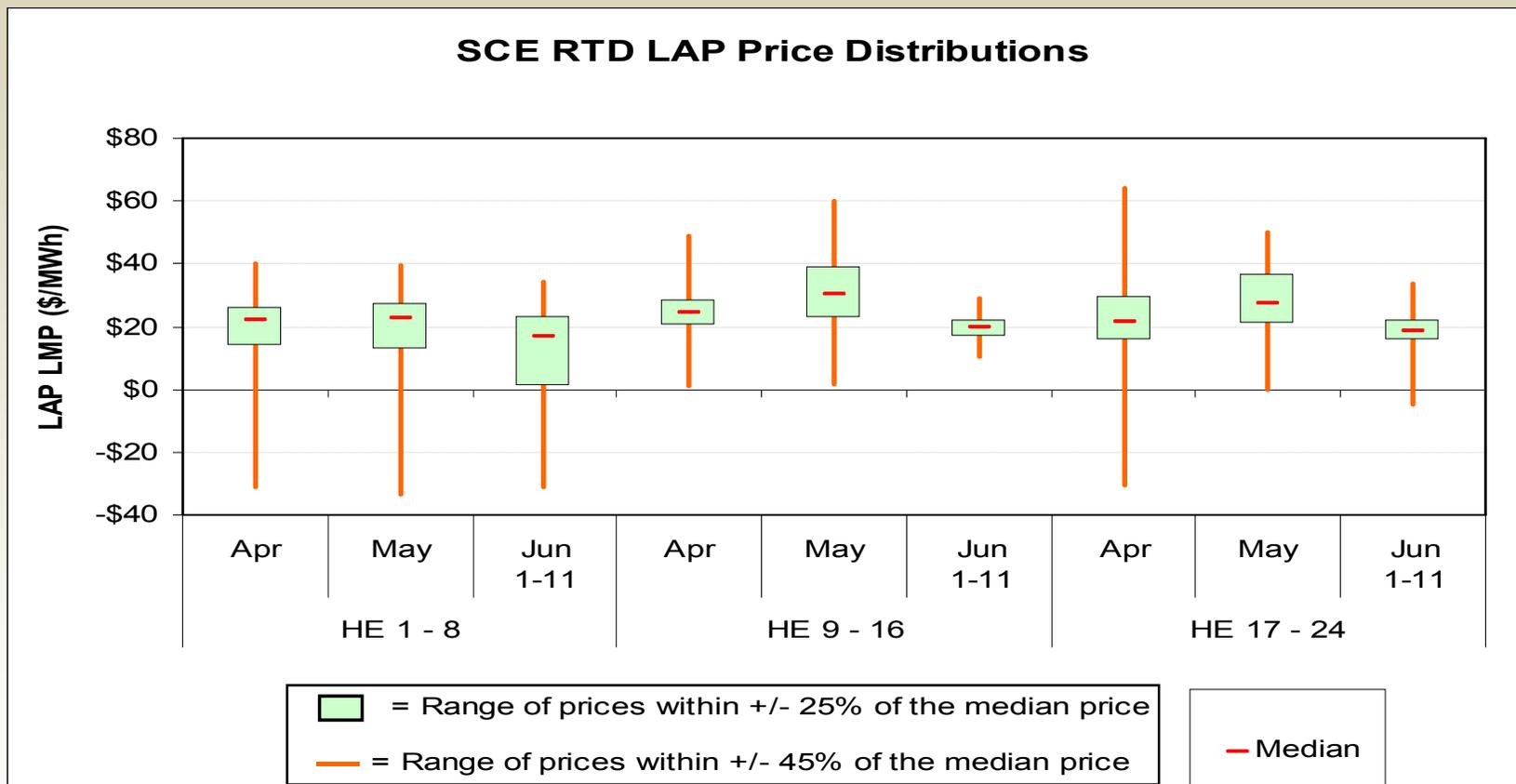
- Pursue further refinements to the real time market optimization that would reduce extremely inefficient (but mathematically correct) dispatch
 - Parameter Tuning
 - Shift Factors (Lossless vs. “lossy” shift factors)

RTD Price Volatility – PG&E LAP Prices



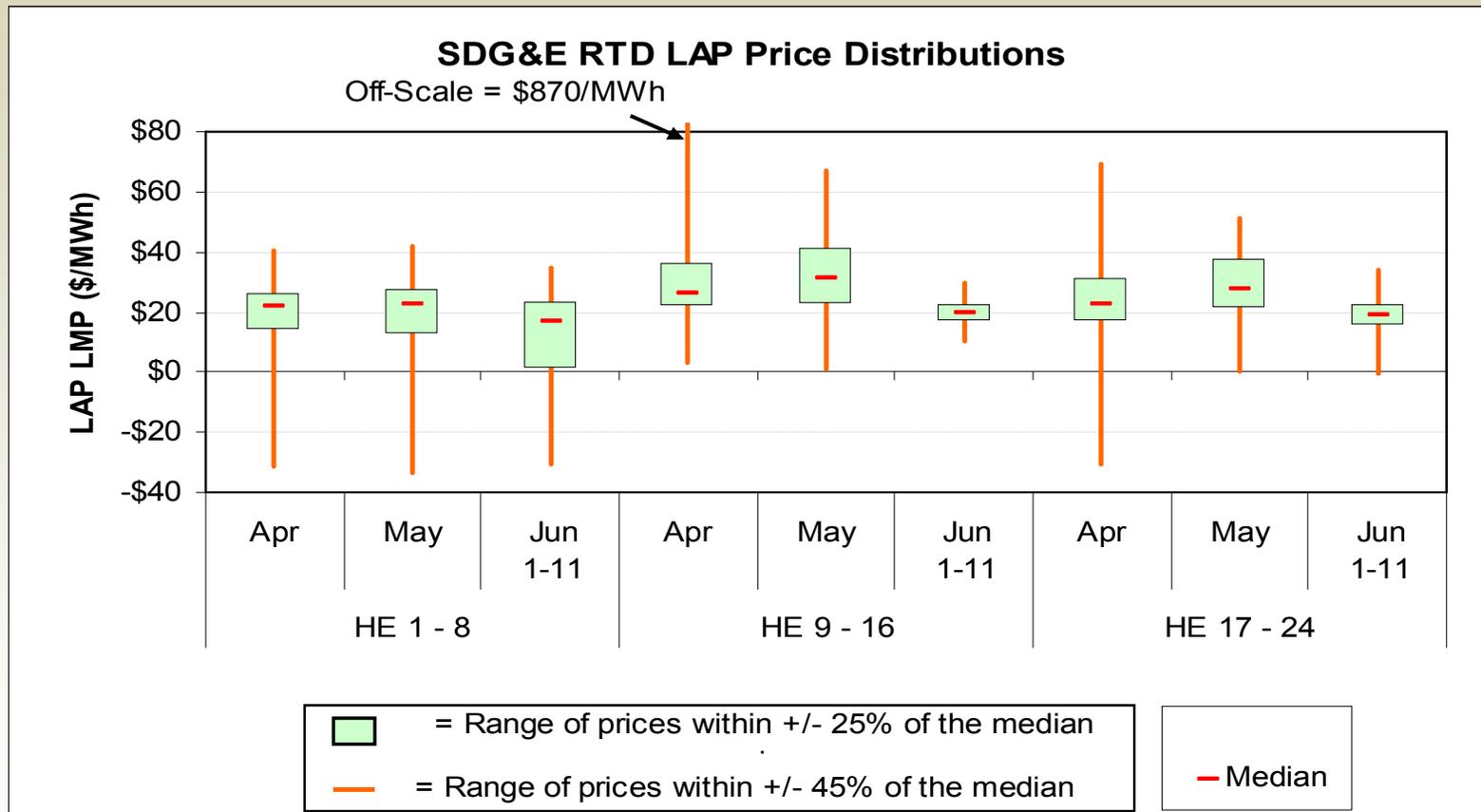
- Negative price volatility consistent in morning hours (1-8)
- Positive trend of reduced volatility in other periods (9-16, 17-24)

RTD Price Volatility – SCE LAP Prices



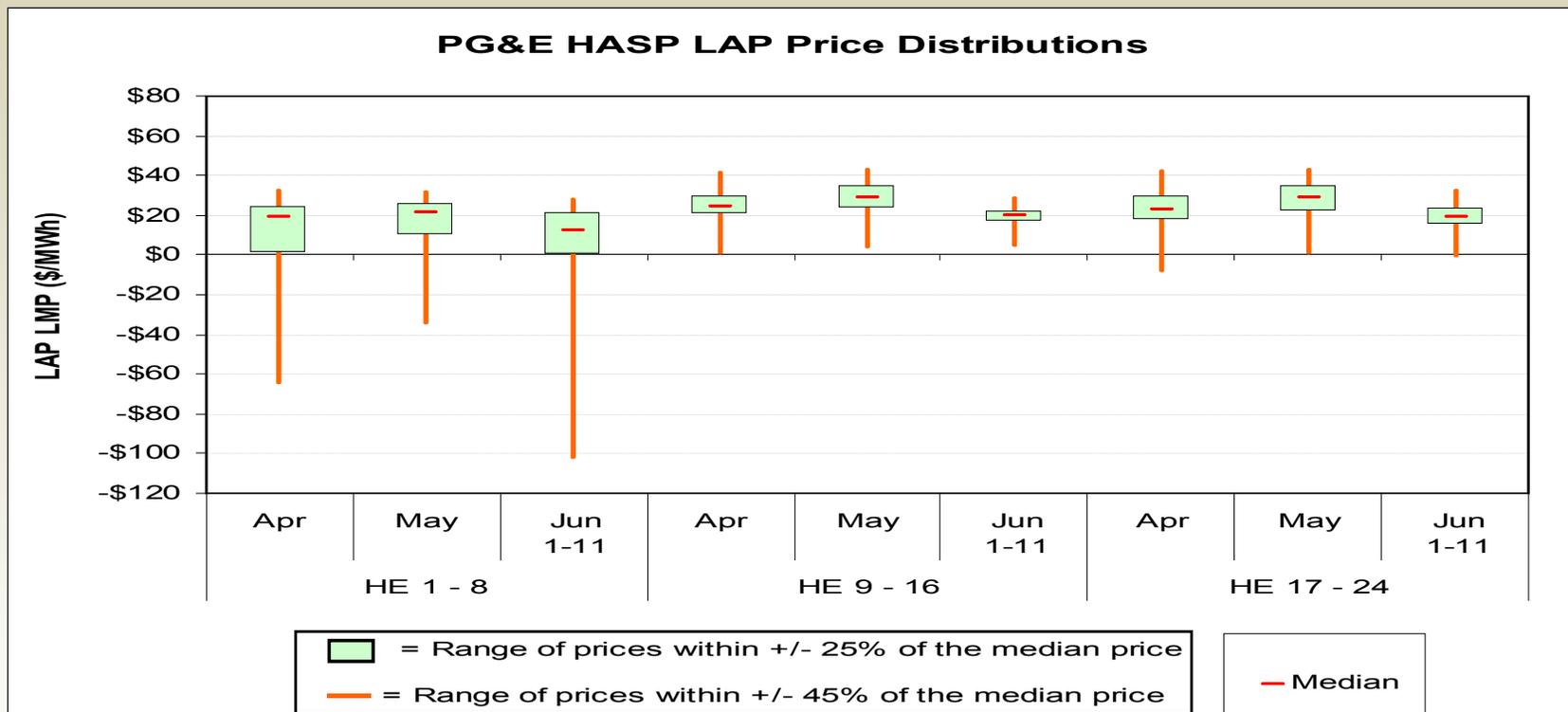
- Similar observations to PG&E LAP prices except SCE LAP prices in May showed higher volatility during mid-day (9-16).

RTD Price Volatility – SDG&E LAP Prices



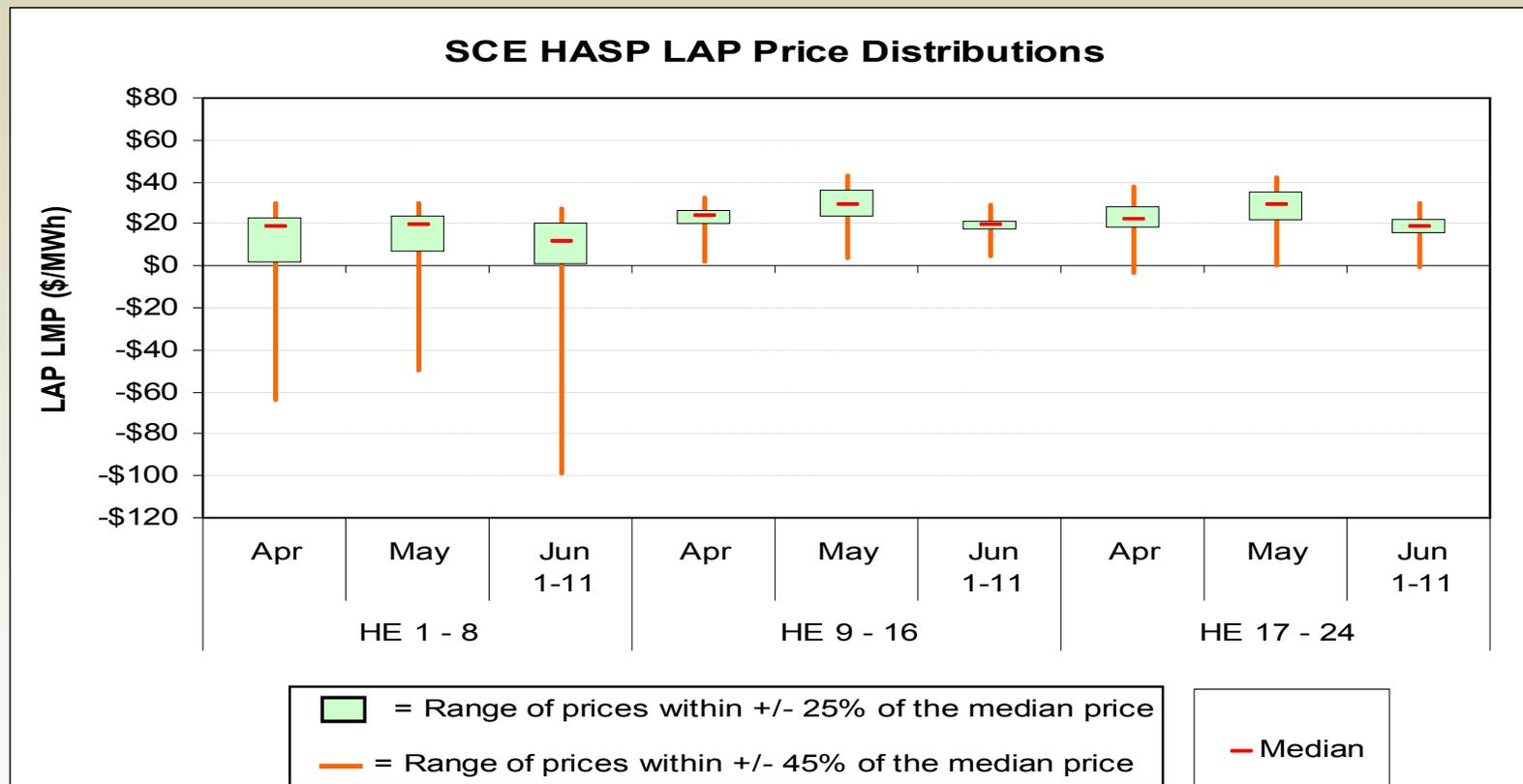
- Similar observations to PG&E LAP prices

HASP Price Volatility – PG&E LAP Prices



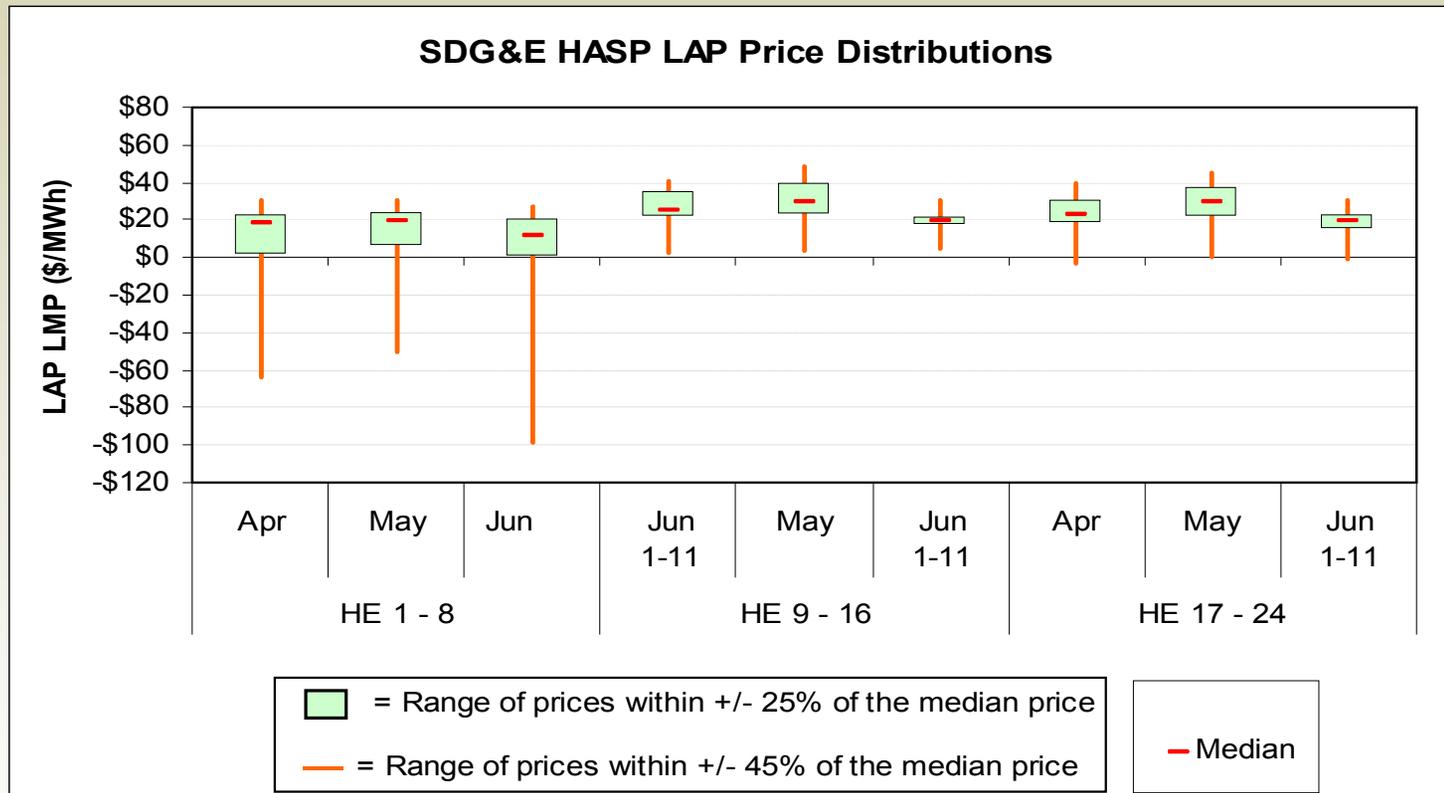
- Morning Hours (1-8) – HASP negative price volatility improved in May but worsened in June.
- Other periods (9-16, 17-24) – Positive trend of reduced price volatility in May & June

HASP Price Volatility – SCE LAP Prices



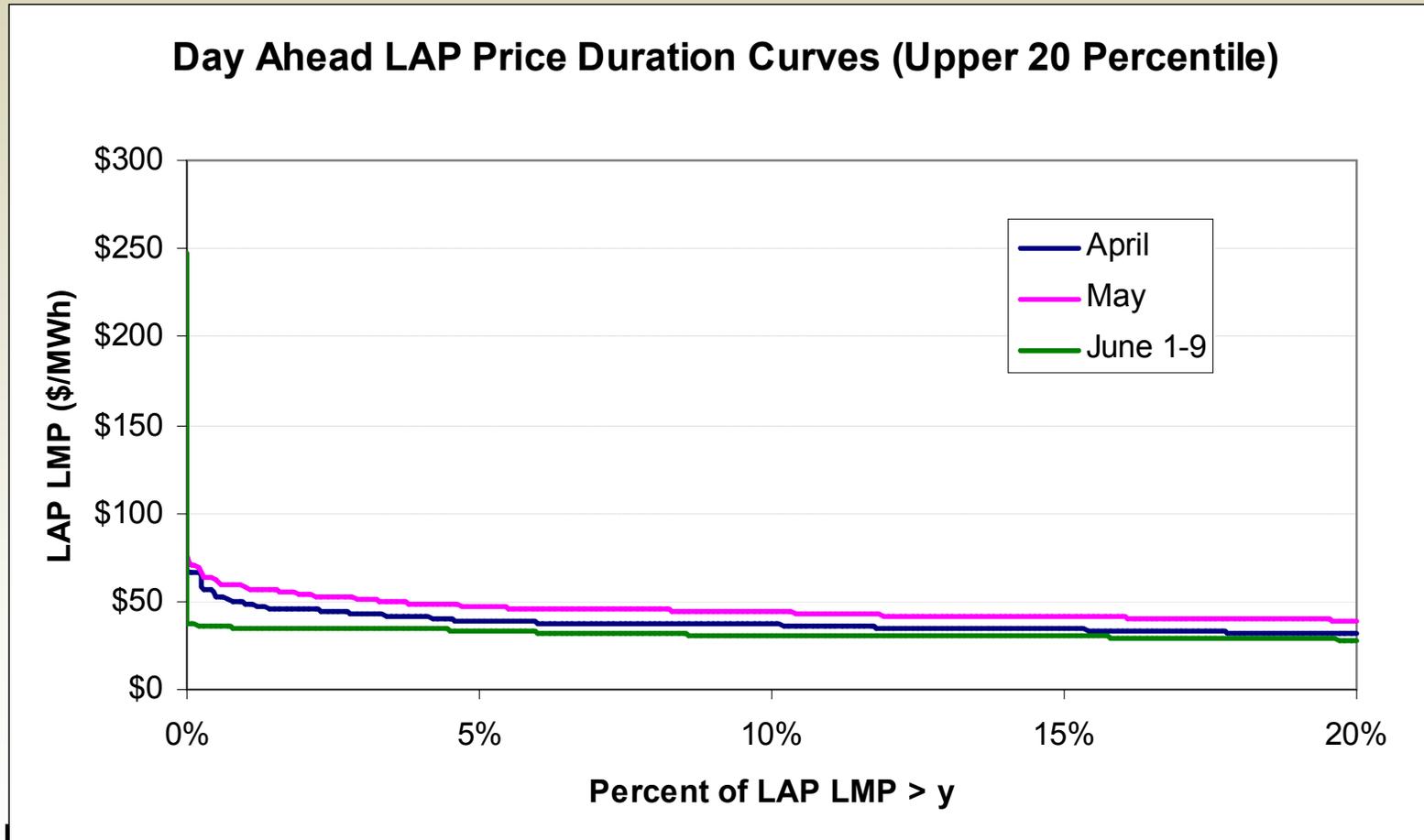
- Similar observations to PG&E except price volatility for SCE LAP prices during mid-day (9-16) increased in May.

HASP Price Volatility – SDG&E LAP Prices

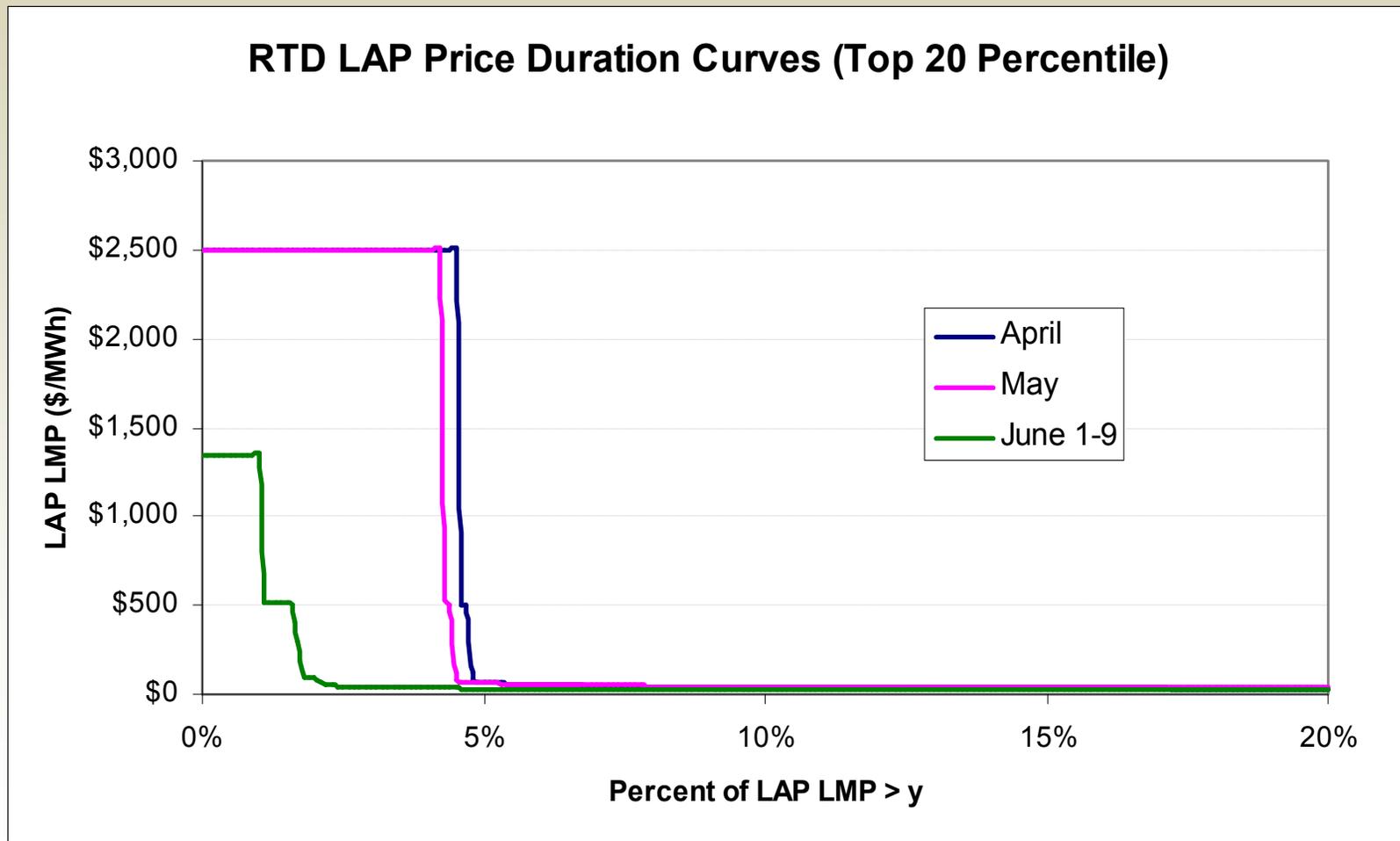


- Similar observations to PG&E except price volatility for SDG&E LAP prices during mid-day (9-16) increased in May.

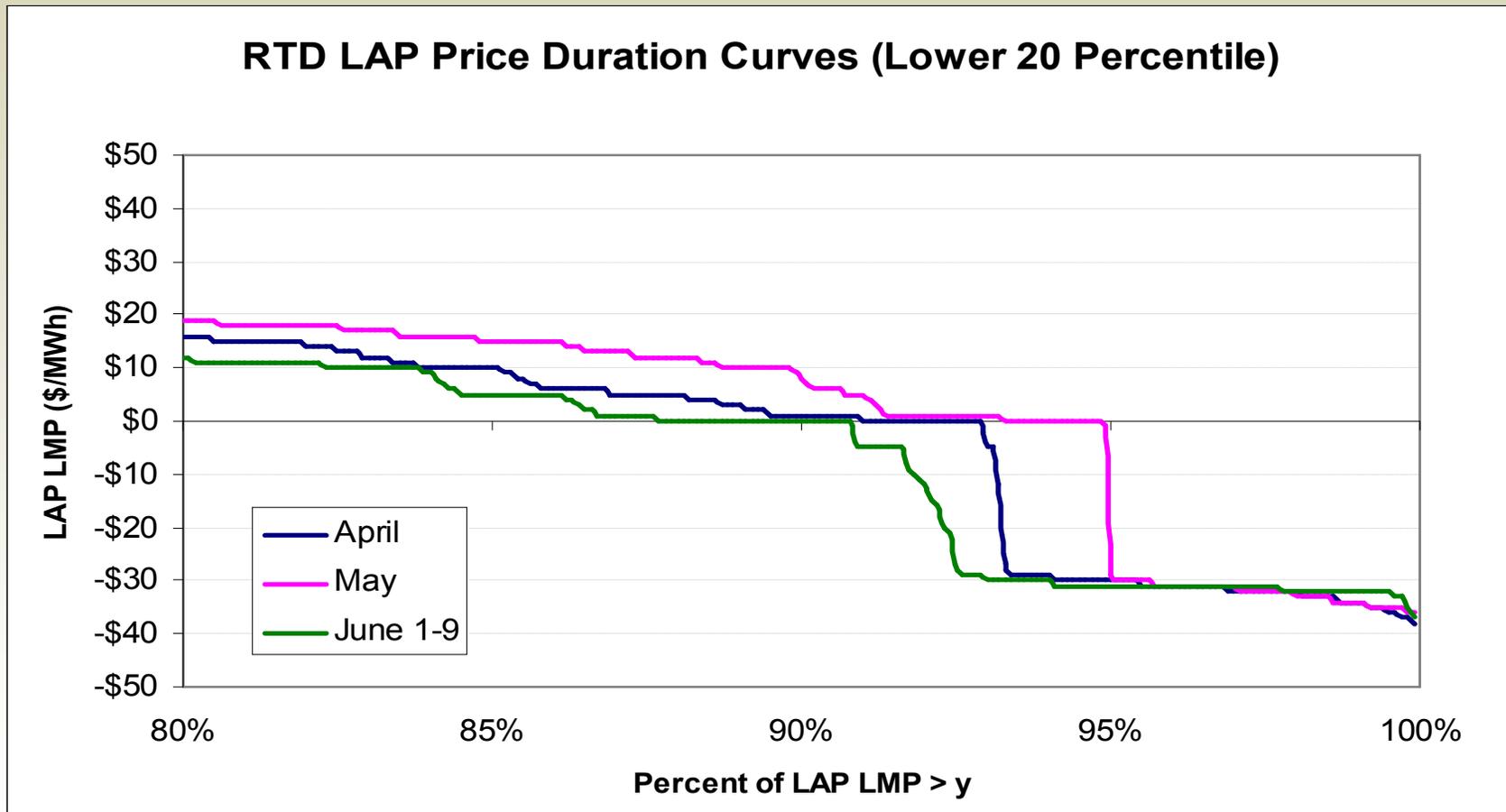
Day Ahead LAP Prices – Very stable with few extreme prices.



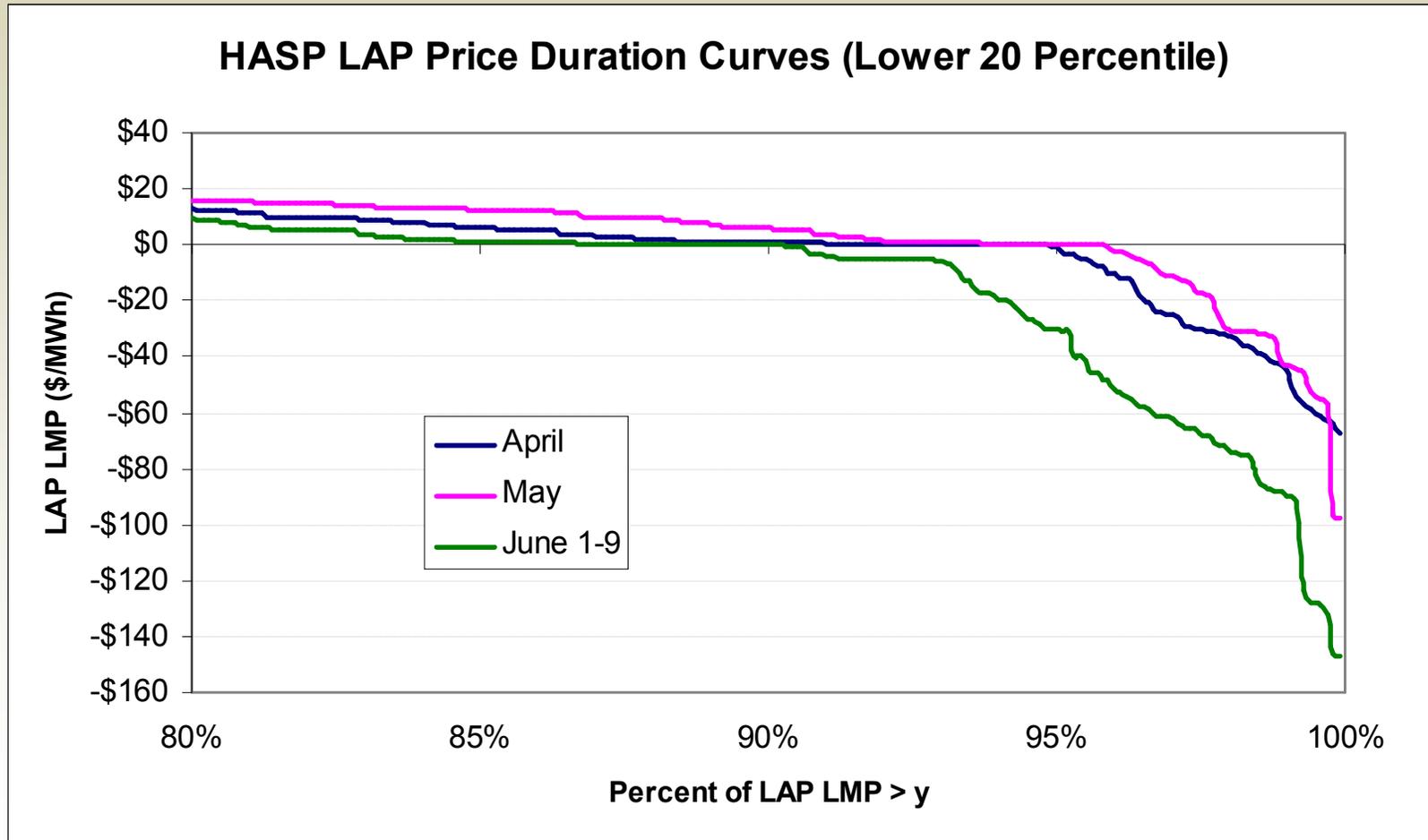
RTD LAP Prices – Frequency of extreme positive prices declined significantly in June



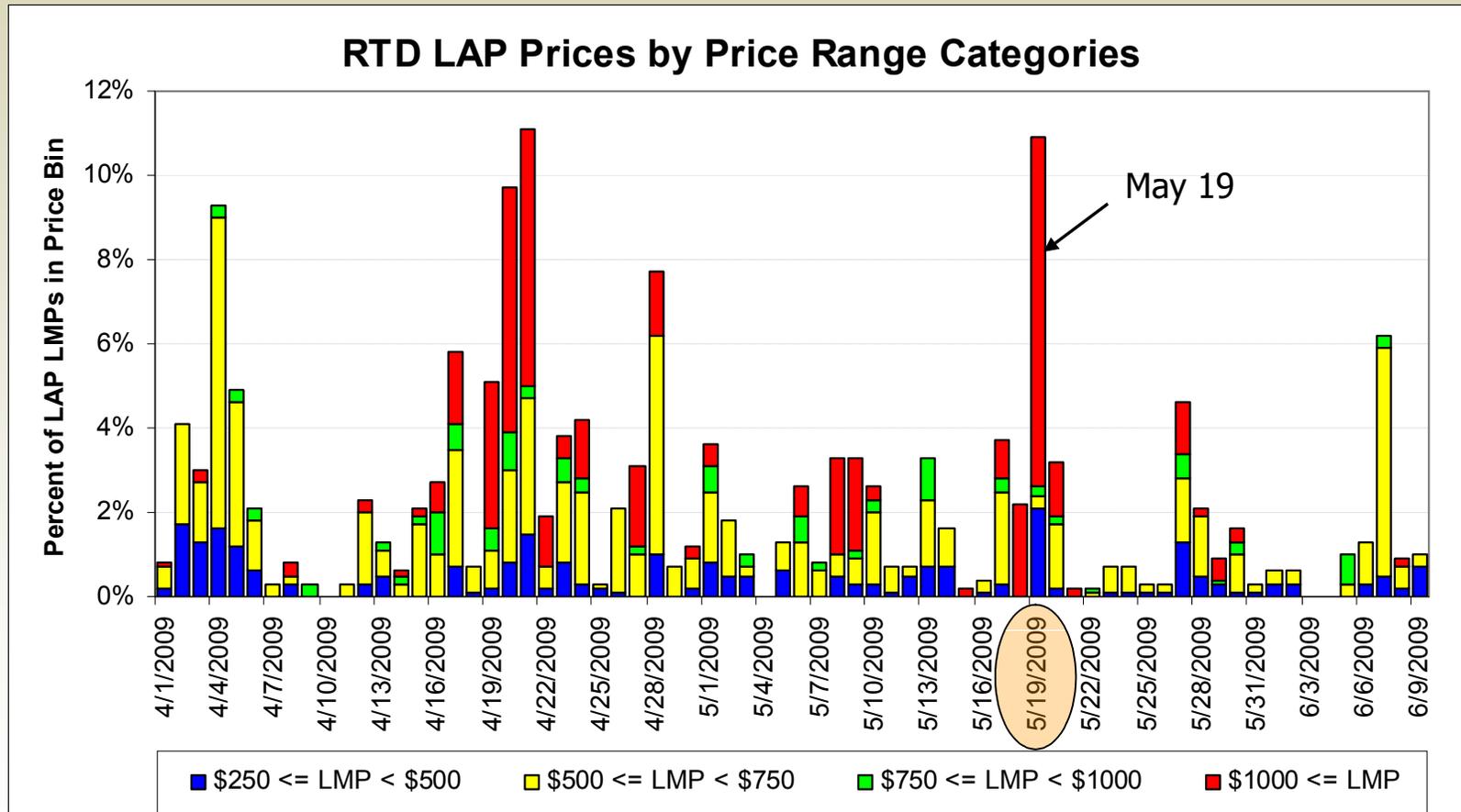
RTD LAP Prices – Frequency of extreme negative prices declined in May (relative to April) but increased in June



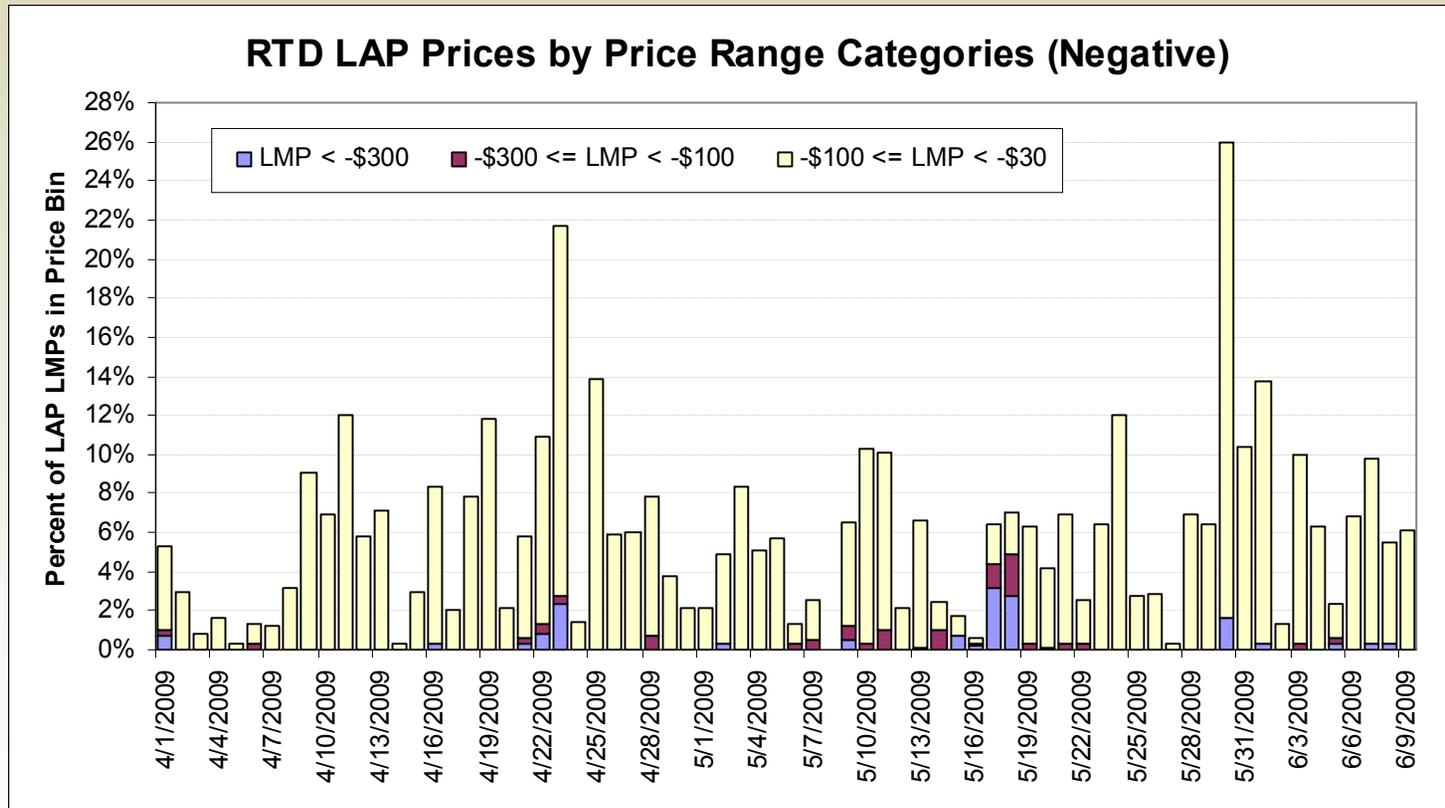
HASP LAP Prices – Frequency of extreme negative HASP prices increased in June.



After May 19, extreme positive RTD LAP prices have moderated.



Frequency of extreme negative RTD LAP prices moderated in May but increased in June



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Extreme negative HASP prices moderated in May but increased in June

