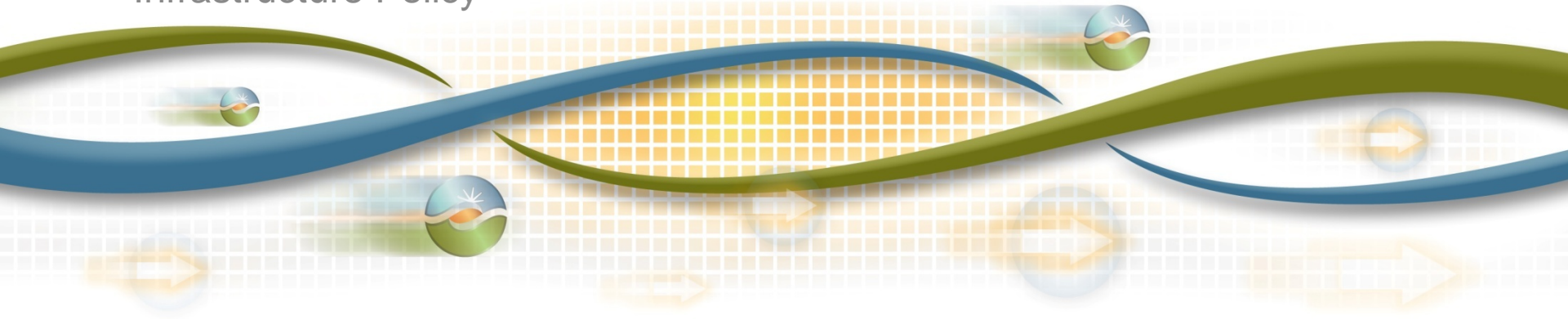


# Load Granularity Price Dispersion Study Discussion

Market Surveillance Committee Meeting  
General Session  
December 16, 2014

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Infrastructure Policy



# Background on Load Granularity Refinement Initiative

- FERCs original MRTU decision required ISO to increase number of LAPs in Release 2.
- Conducted two studies, in 2010 and 2013
  - Both studies found price dispersion to be small and stakeholders did not support additional LAPs in either iteration.
- In February 2014, ISO filed for waiver of requirement for disaggregation which was denied in June.
  - Granted one year extension to disaggregate or seek further relief

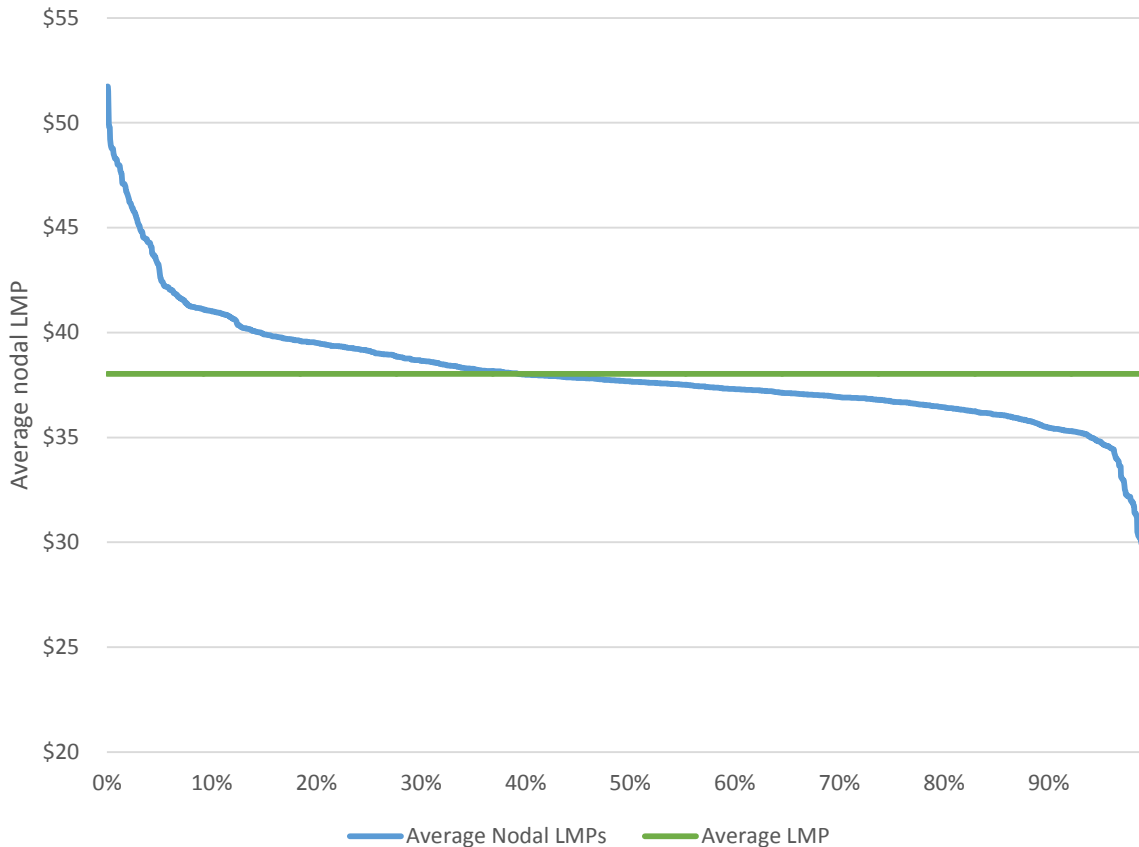
## FERC instructed that any subsequent pricing study to support a new request must include

- Detailed description of underlying data
- Analysis of reasonable range of different alternate levels of disaggregation
- Focused discussion on areas with large price differences
- Analysis of entire ISO footprint, including SDG&E service territory
- Properly supported estimates of implementation costs for different levels of disaggregation

# Current pricing study

- Analyzing day-ahead nodal energy prices from 2011-2014.
- Analyzing average LMPs and average difference of nodal and DLAP LMPs
- Regression analysis on nodal LMPs from 2011-2014
- Analyzing trends geographically, for all four LAPs, as well as temporally
- Conducting a cost benefit analysis

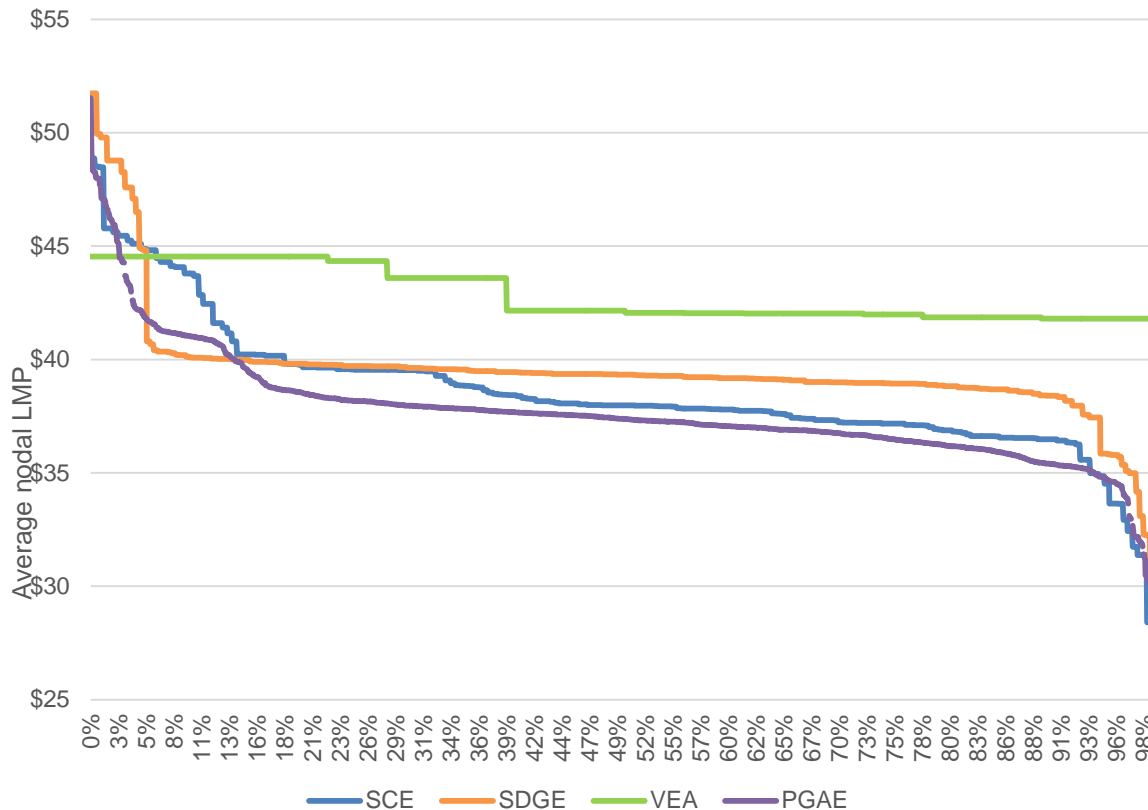
# Preliminary Results – Average nodal LMP duration curve 2011-2014



- The average nodal LMP ranges from \$52/MWh to \$26/MWh
- 90% of the average LMPs range from \$42.23/MWh to \$34.64/MWh
- The duration curves shift upward slightly year to year

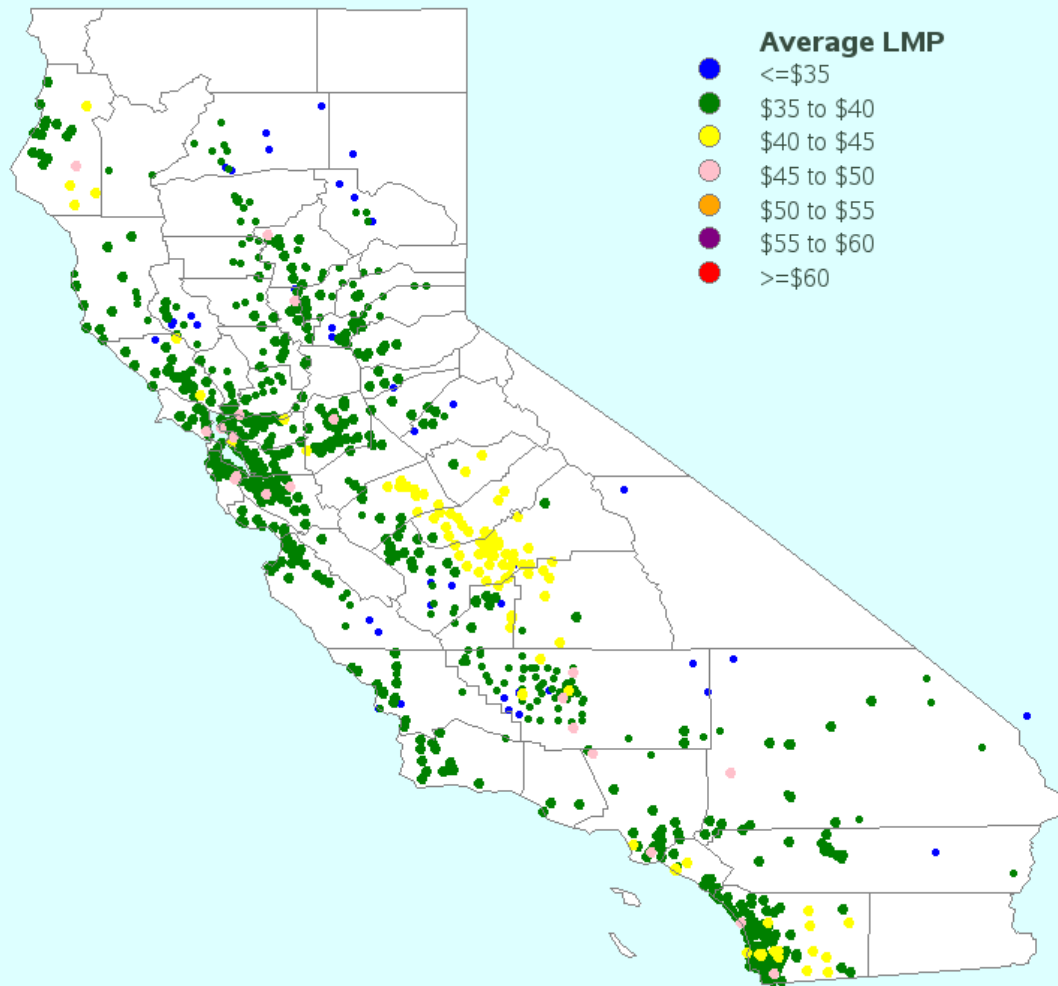


# Preliminary Results – Average nodal LMP duration curve by LAP



- Three major LAPS have similar duration curves.
- VEA has more of a flat duration curve, but still has some price dispersion.

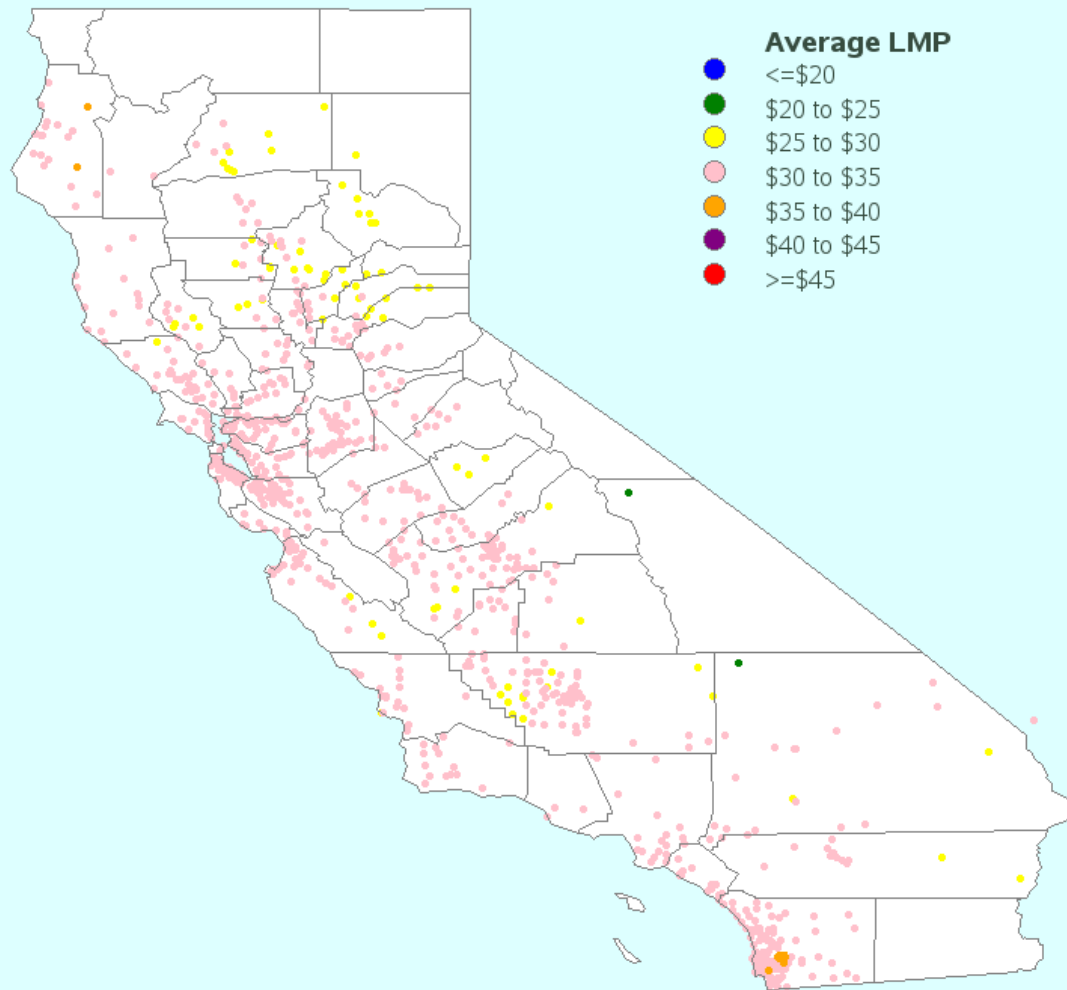
# Preliminary Results – Average nodal LMPs 2011-2014



- Small grouping of nodes priced in the \$40/MWh-\$45/MWh range in Fresno, Madera, Merced, and Mariposa counties
- Most nodes statewide are, on average, between \$35/MWh and \$45/MWh
- A few scattered higher priced (pink) and lower priced (blue) nodes.

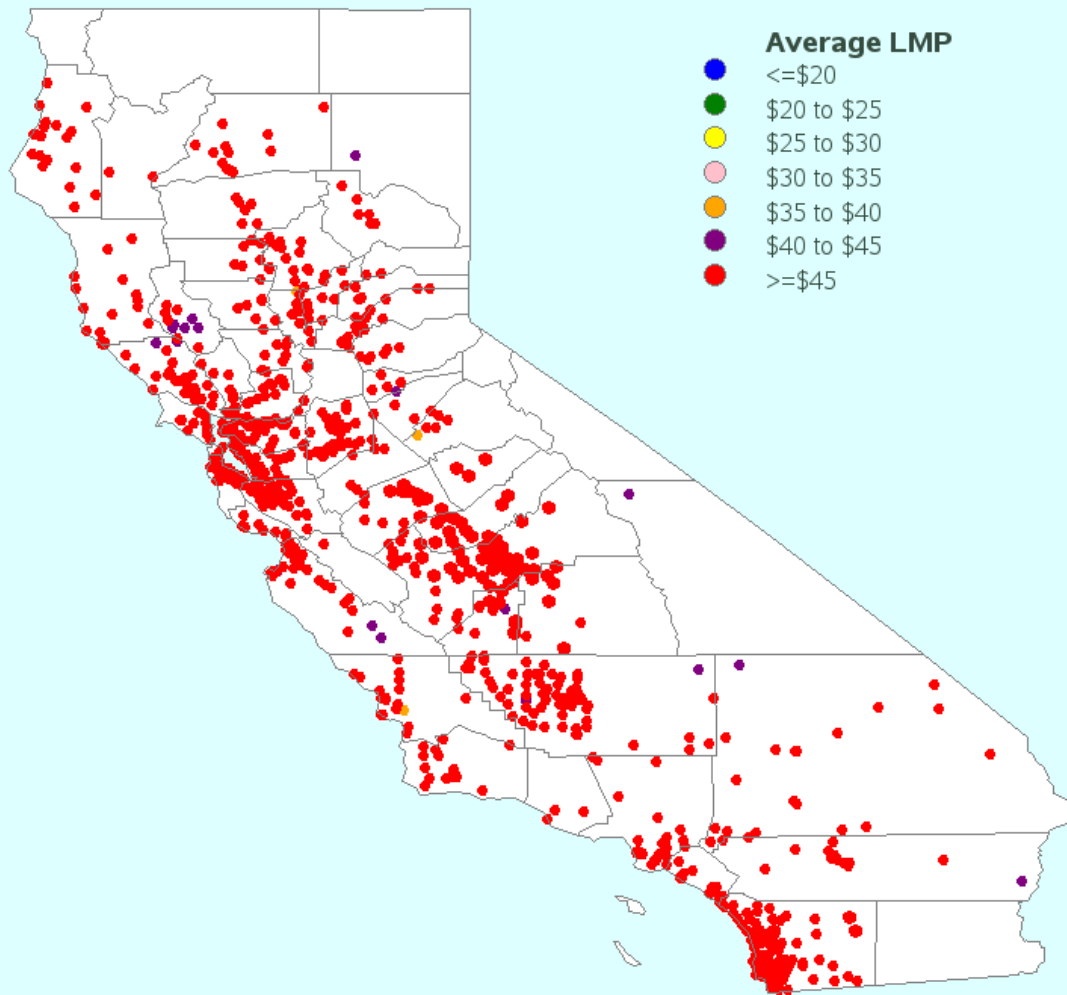


# Preliminary Results – Average nodal LMPs 2011-2012



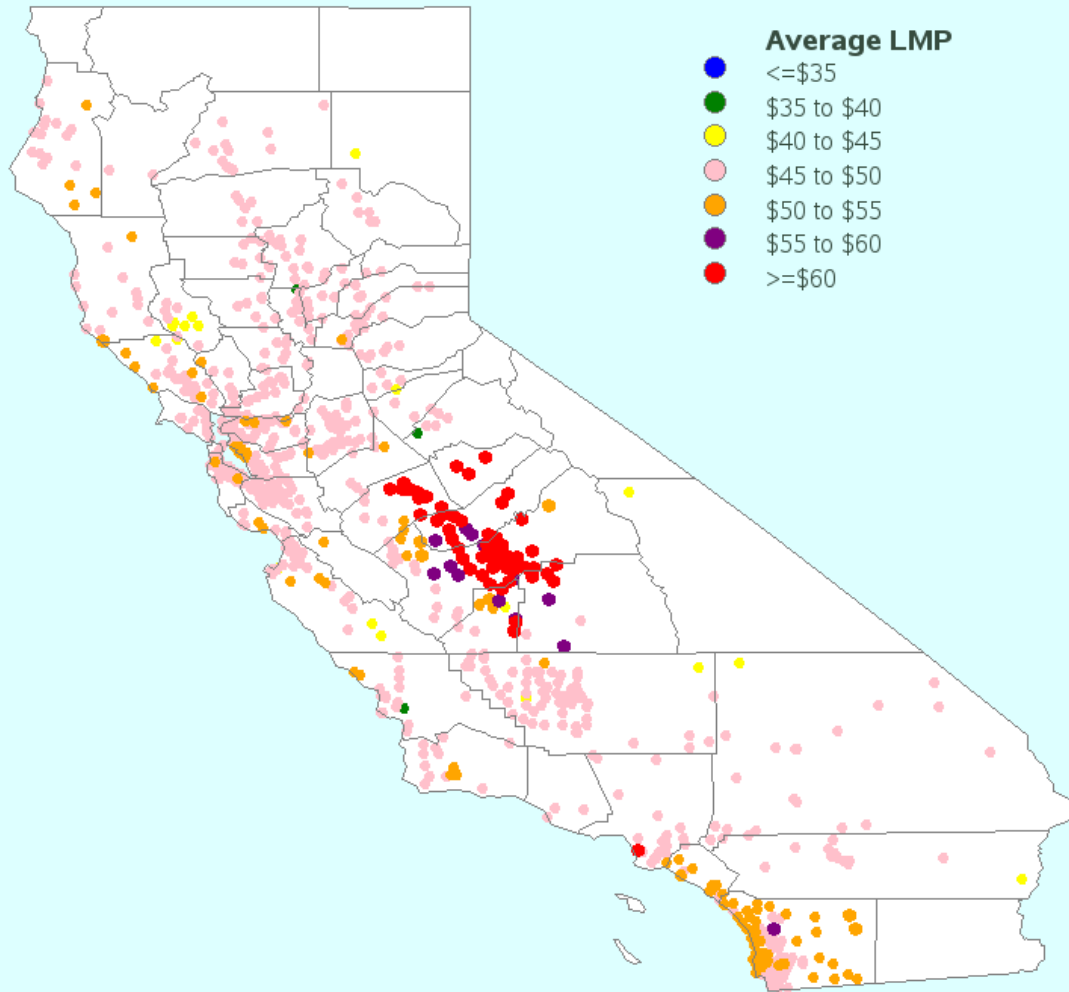
- In 2011 and 2012, average LMPs were mostly between \$30/MWh and \$35/MWh.
- Very few scattered higher priced (orange) and lower priced (green) nodes.

# Preliminary Results – Average nodal LMPs 2013-2014



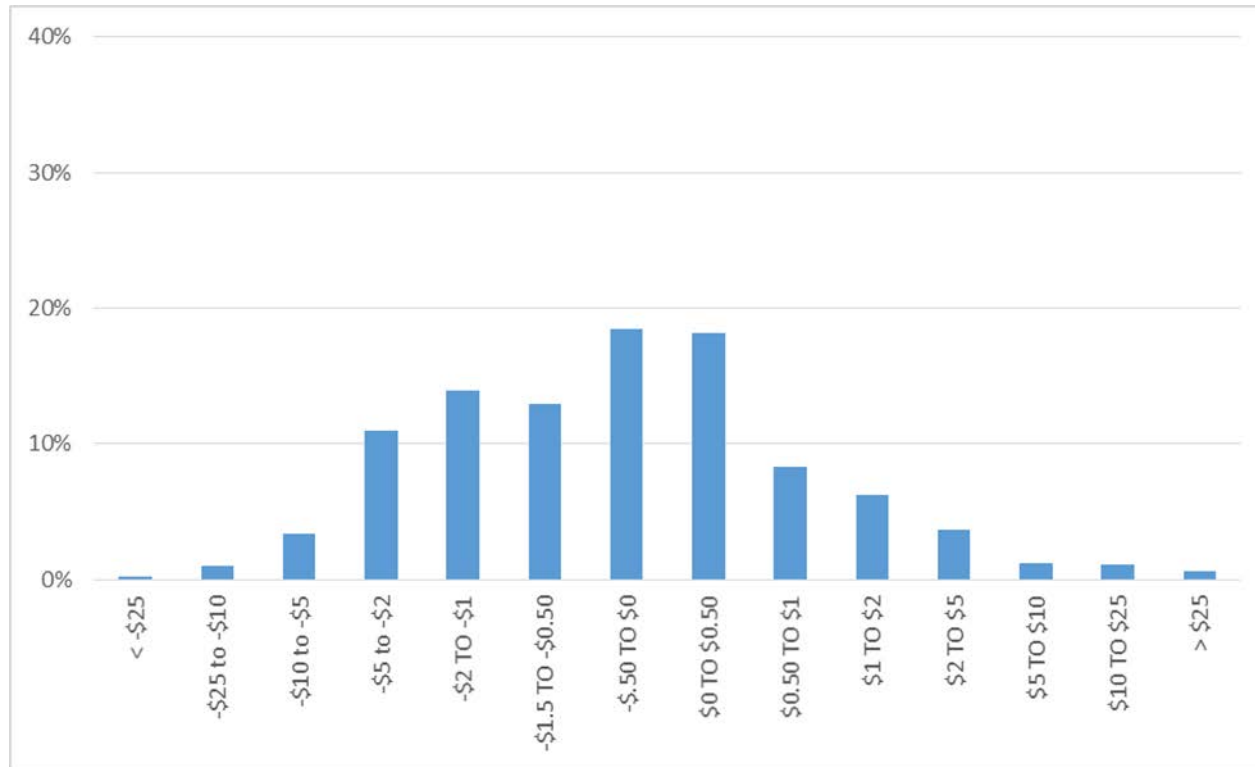
- Average LMPs increased in 2013 and 2014.
- Most nodes were more than \$45/MWh, on average
- Greenhouse gas and higher gas prices contributed to higher average LMPs.

# Preliminary Results – Average nodal LMPs 2013-2014 (LMP categories adjusted)



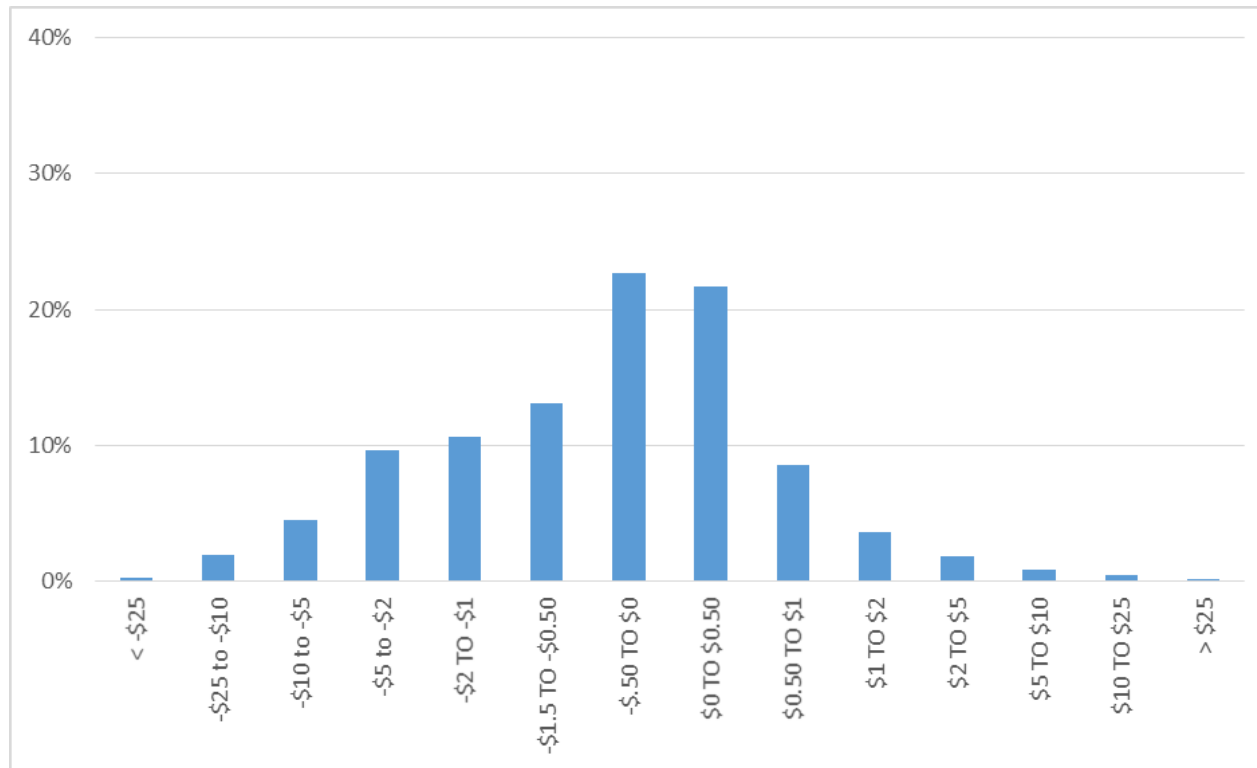
- Adjusted price scale from previous slide.
- Group of nodes in Fresno, Madera, Merced, and Mariposa county tend to be higher priced.

# Preliminary Results – Distribution of average differences (nodal LMP minus DLAP LMP) PGAE



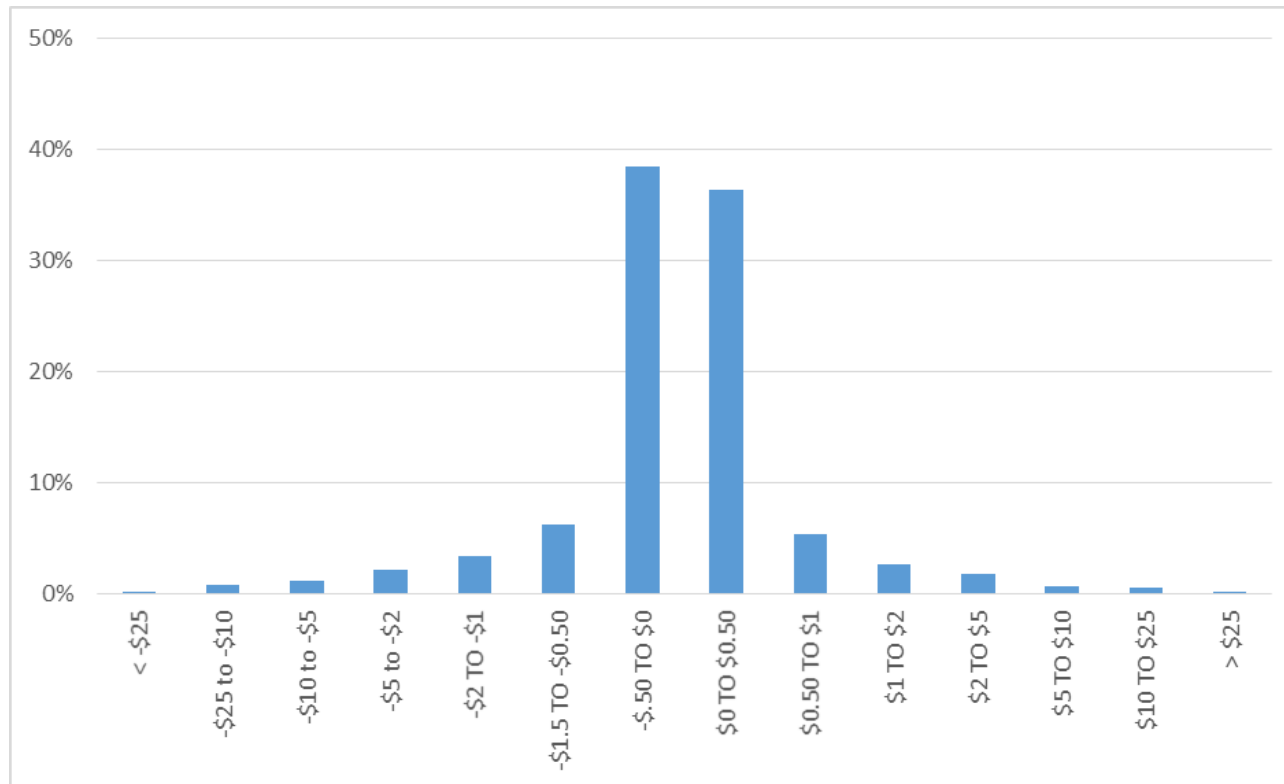
- 40% of LMPs were within \$0.50 of DLAP LMP.
- 78% within \$2 of DLAP LMP.
- Skewed slightly to the left.

# Preliminary Results – Distribution of average differences (nodal LMP minus DLAP LMP) SCE



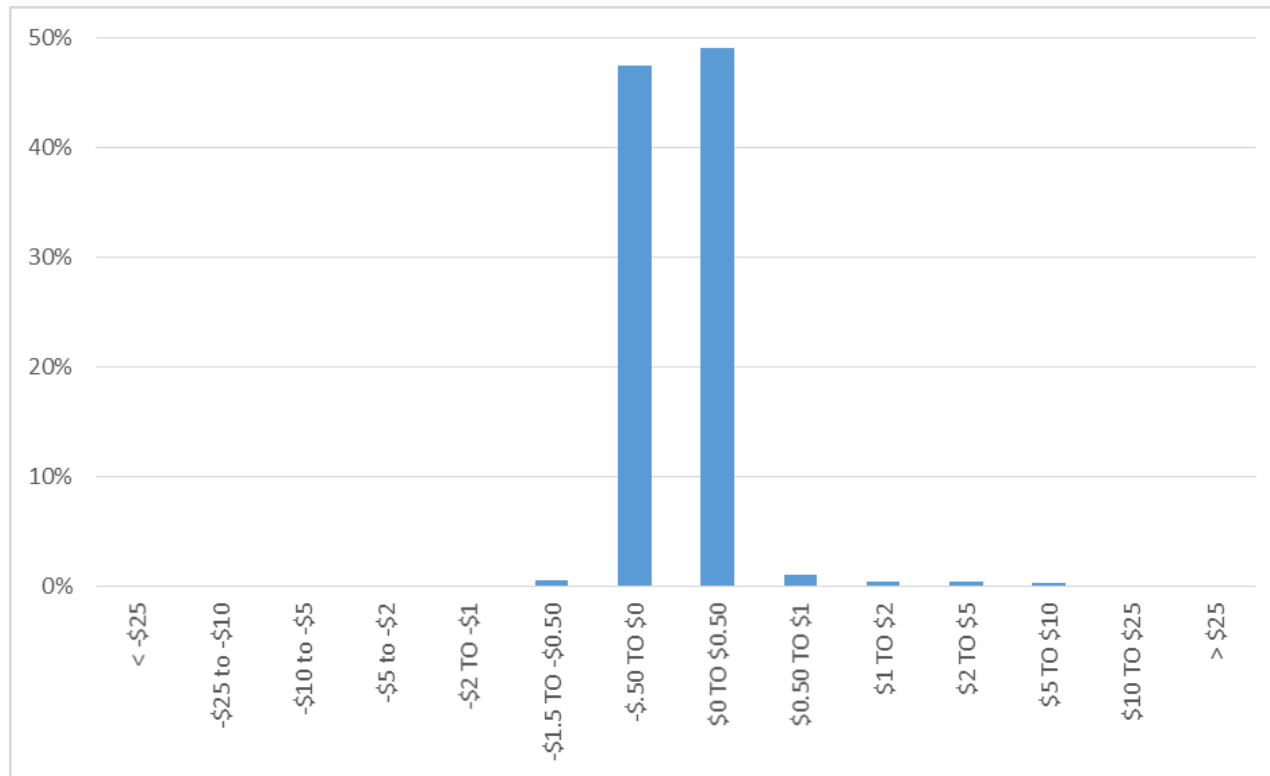
- 44% of LMPs were within \$0.50 of DLAP LMP.
- 80% within \$2 of DLAP LMP.
- Skewed slightly to the left.

# Preliminary Results – Distribution of average differences (nodal LMP minus DLAP LMP) SDGE



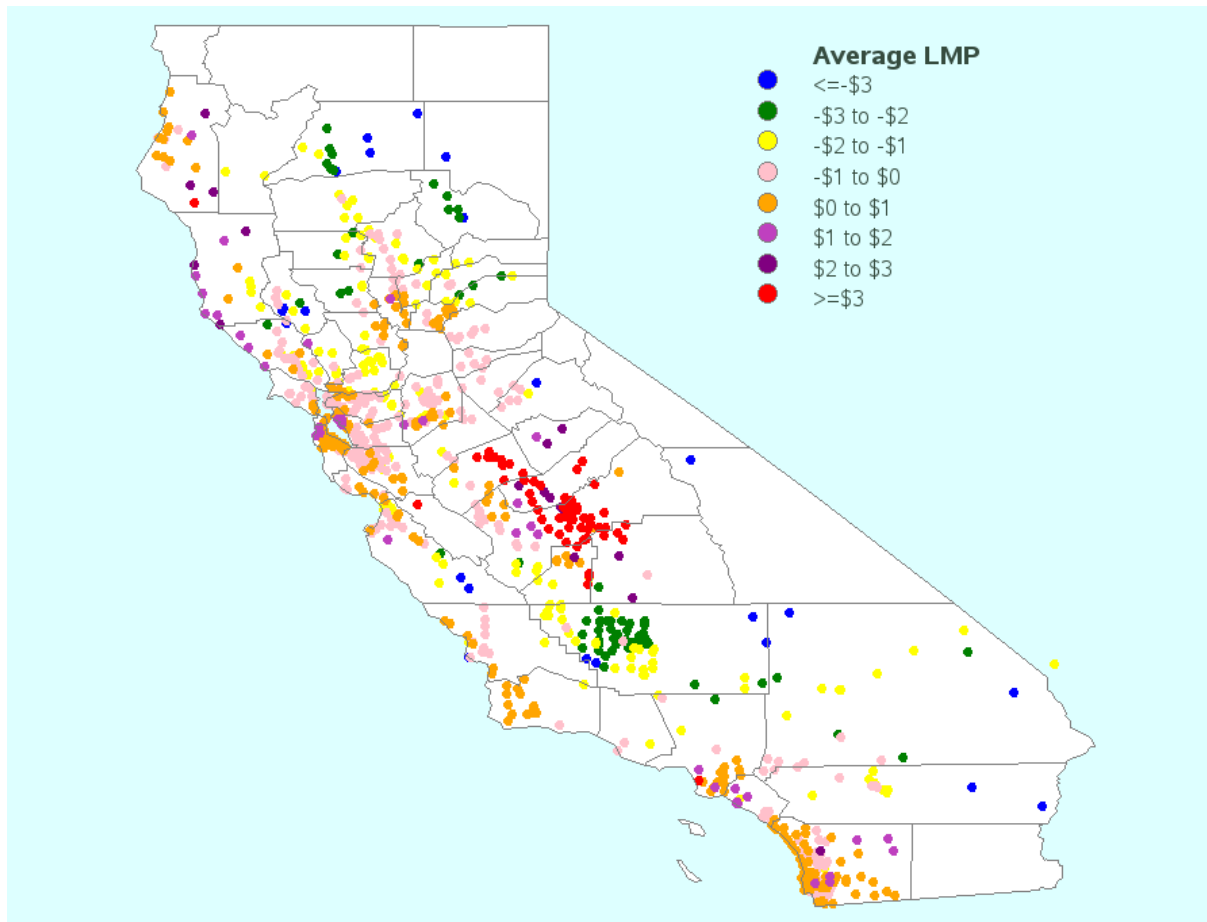
- 75% of LMPs were within \$0.50 of DLAP LMP.
- 92% within \$2 of DLAP LMP.
- Centered around a \$0 difference.

# Preliminary Results – Distribution of average differences (nodal LMP minus DLAP LMP) VEA



- 96.5% of LMPs were within \$0.50 of DLAP LMP.
- 98.9% within \$2 of DLAP LMP.
- Centered around a \$0 difference.

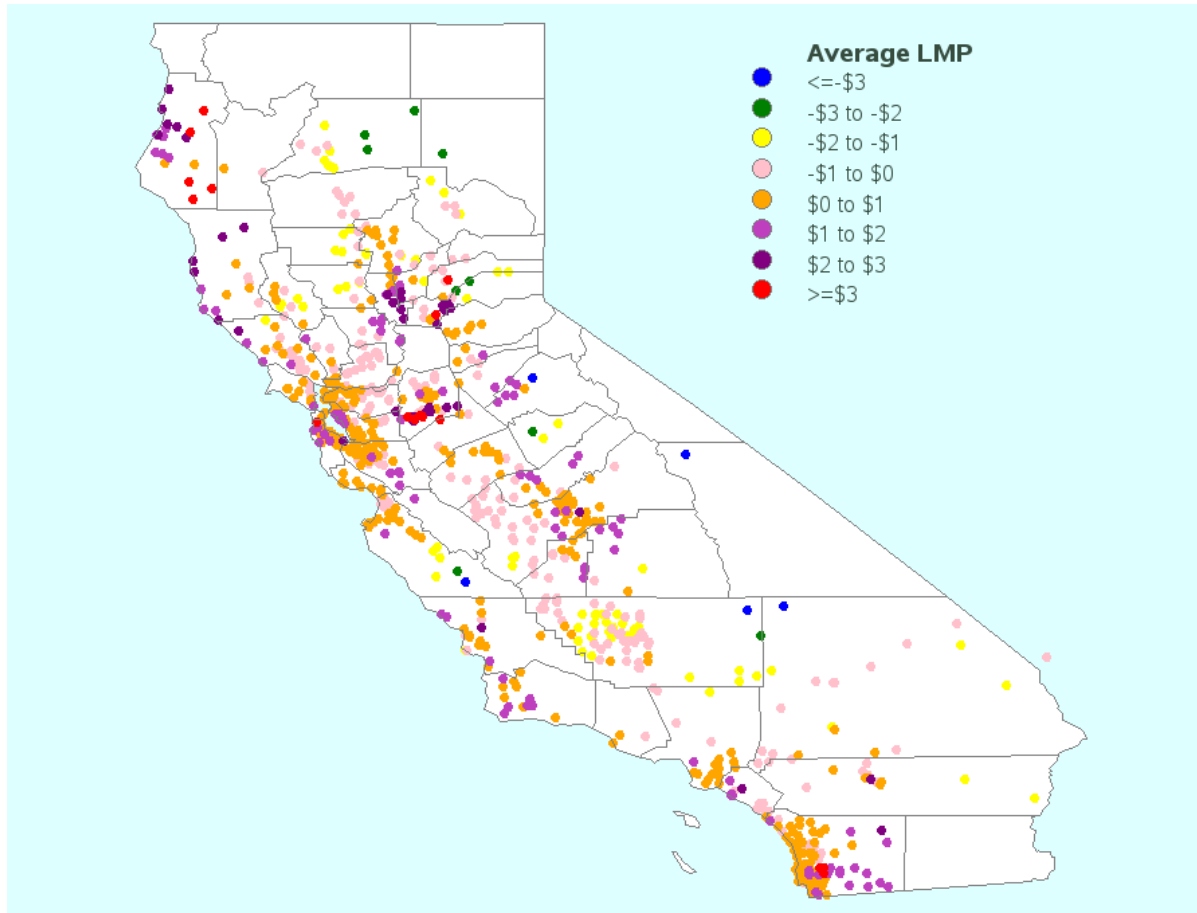
# Preliminary results – average difference of nodal LMPs to DLAP LMPs (2011-2014)



- Fresno, Madera, and Merced area tends to have higher nodal LMPs relative to the DLAP LMP.
- Most price differences are scattered throughout the state.

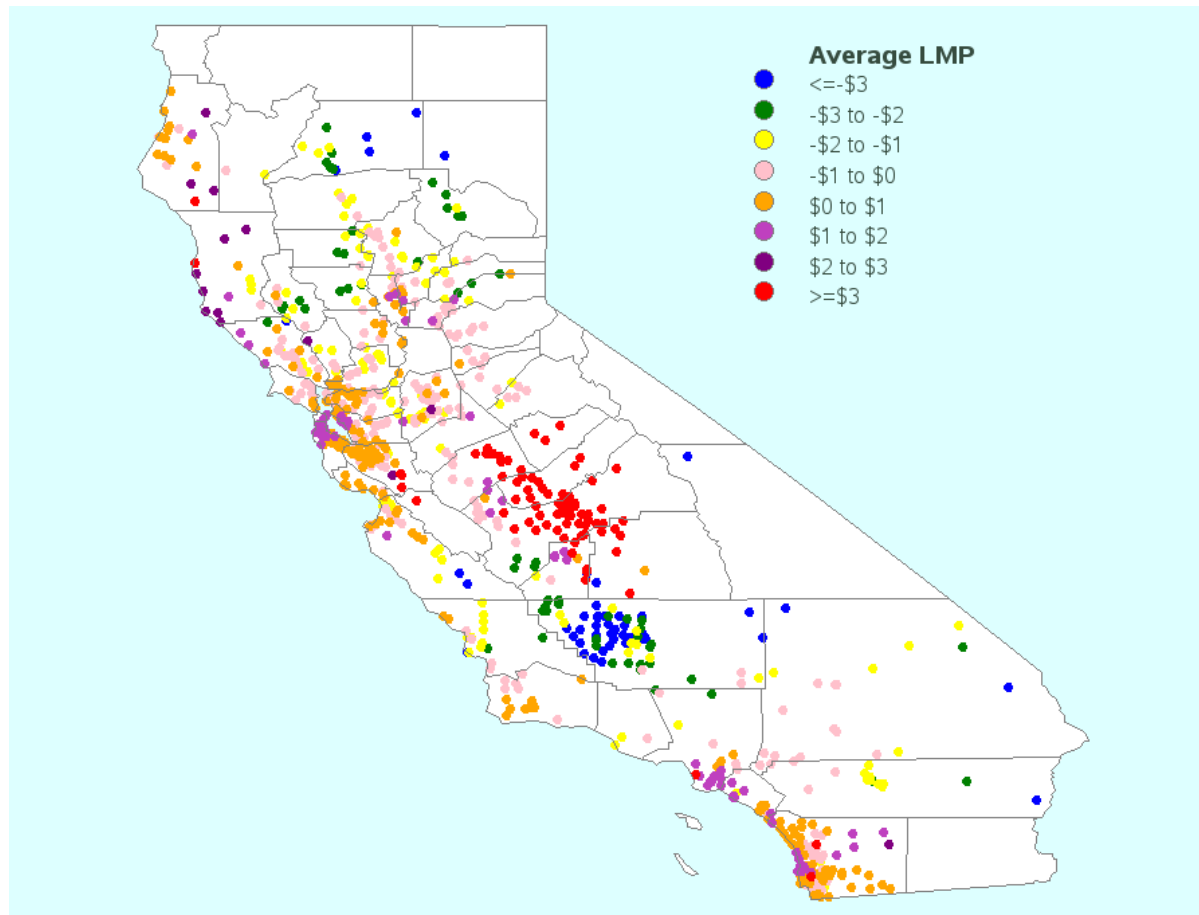


# Preliminary results – average difference of nodal LMPs to DLAP LMPs (2011-2012)



- 2011 and 2012 have less differences in prices than 2013 and 2014.
- Fresno, Madera, and Merced areas still show slightly higher nodal LMPs relative to the DLAP LMP.

# Preliminary results – average difference of nodal LMPs to DLAP LMPs (2013-2014)



- Price differences in 2013 and 2014 are more prevalent in a few areas.
- Fresno, Madera, and Merced areas have, on average, more than \$3/MWh higher nodal LMPs relative to the DLAP LMP.
- Area just south of Fresno has nodal LMPs that are, on average, more than  $-\$3/\text{MWh}$  below the DLAP LMP.

# Cost Benefit Analysis - Costs

- Market participants and the ISO will incur costs if the ISO creates more granular load zones.
- Collected cost estimations from stakeholders and the ISO
  - Provided estimates for 9 different categories and 4 levels of disaggregation
  - Identified which costs are capital costs, one time implementation costs, and yearly costs.

# Cost Benefit Analysis – Potential Benefits

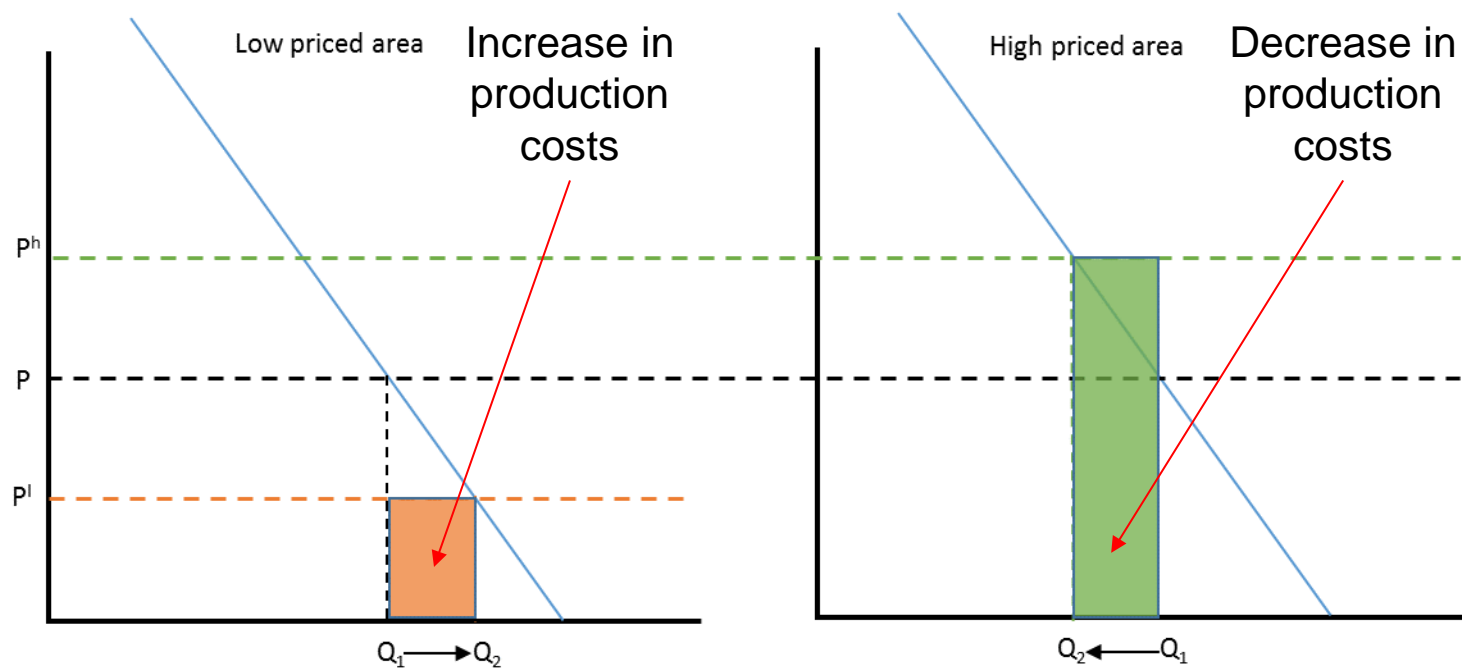
- More accurate wholesale price signals incent investment decisions.
- Increase availability of CRRs in annual allocation process.
- More efficient day-ahead market outcomes
- Reduce the subsidization of high-price areas by low-price areas.
- Others?

# More efficient day-ahead market outcomes

- In the IFM, load is adjusted at the LAP level and nodal load moves together in proportion to the LDFs.
  - Load can be adjusted with the same methodology over smaller geographies with more granular zones, potentially resulting in more efficient market solution.
- Estimate the benefit
  - Identify cases where load was adjusted to solve a constraint.
  - Add a bid curve like the LAP bid curve to mimic a localized demand bid and re-run the new case.
  - The difference of the cost would be the market optimization cost savings.
  - The extrapolate the savings to all similar cases

# Reduce subsidization of high-price areas by low-price areas.

- Areas with high priced load are being subsidized by areas with lower priced load.
- Estimate the decrease in production cost with nodal load.



# Updated Schedule for Load Granularity Refinement Initiative

- Preliminary Results at December MSC meeting (today)
- Next stakeholder meeting will be held mid January 2015
- Go to Board of Governors in May 2015