

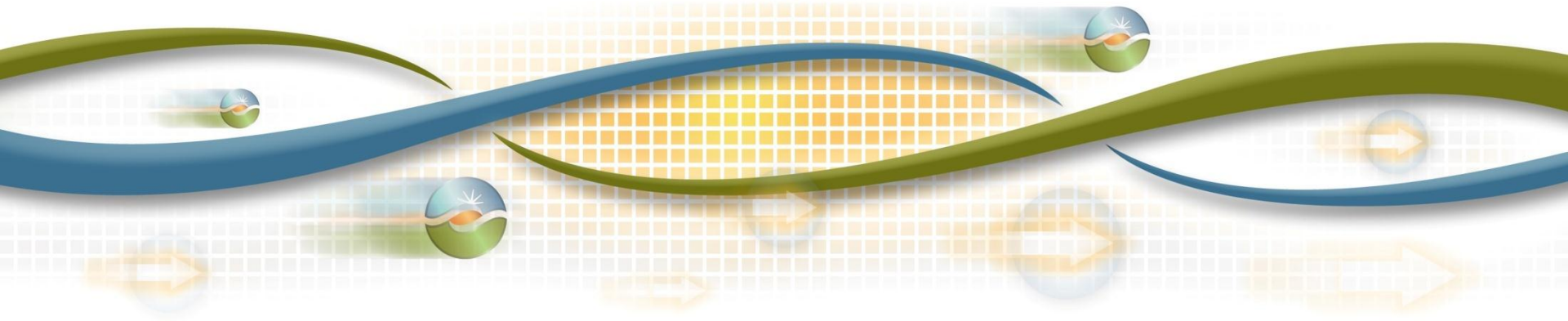


EIM market monitoring and market issues/performance

Energy Imbalance Market Regional Issues Forum

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Department of Market Monitoring



EIM Market Monitoring

Mission Statement

To provide independent oversight and analysis of the CAISO Markets for the protection of consumers and Market Participants by the identification and reporting of market design flaws, potential market rule violations, and market power abuses.

CAISO Tariff, Appendix P

“Each independent system operator ... must include a mission statement ... that identifies the Market Monitoring Unit’s goals, including the protection of consumers and market participants by the identification and reporting of market design flaws and market power abuses.”

FERC Order 719

Department of Market Monitoring (DMM)

- Internal business unit of the ISO
 - ~15 staff (economics, engineering, data analysis)
 - Access to all ISO market and operational data
 - Work closely with ISO staff on market design/monitoring
- Independence
 - DMM Director reports directly to ISO Board
 - Administratively reports directly to CEO
- Work/communicate closely with FERC
- Work closely with state PUC staff to provide information on market performance and market design issues.

Role and Responsibilities of DMM

- Review market performance
 - Analyze market performance and efficiency
 - Report on market performance (quarterly and annual reports, special studies/reports and briefings)
 - Develop/recommend improvements in rules/operational practices
- Review market participant behavior
 - Review participant activity based on screens and analysis of market data
 - Discussions with participants and stakeholders
 - Discuss/refer potentially inappropriate behavior to FERC Office of Enforcement

Market design/operational improvements

- Work closely with ISO staff and stakeholders on developing improvements in rules/operational practices.
- Provide extensive analysis/input on potential market design changes:
 - Promote market efficiency
 - Prevent gaming/manipulation
- Provide recommendations directly to ISO Management and Board.
- May make formal referrals to FERC about significant market design flaws DMM feels have not been addressed through this process.

Referrals to FERC

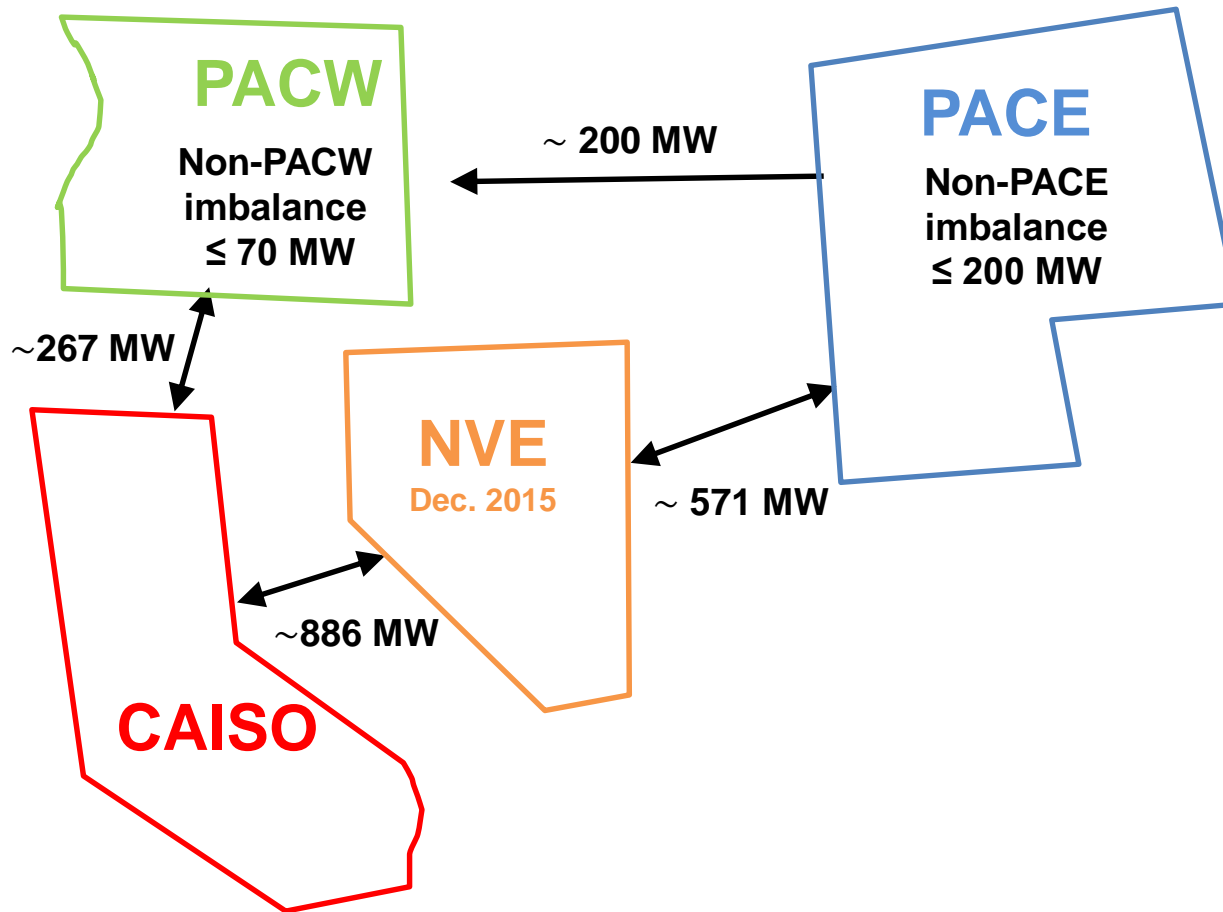
- Make formal referrals to FERC about potential violations of the ISO tariff and FERC market rules.
- Work closely with FERC staff on providing data and analytics to support investigations.
- Key FERC behavioral rules are intentionally broad:
 - False or misleading information
 - Manipulation
- FERC can (and does) impose significant sanctions:
 - Disgorge profits from behavior
 - Penalties (often up to 10 times disgorged profits)

EIM Market Issues and Performance

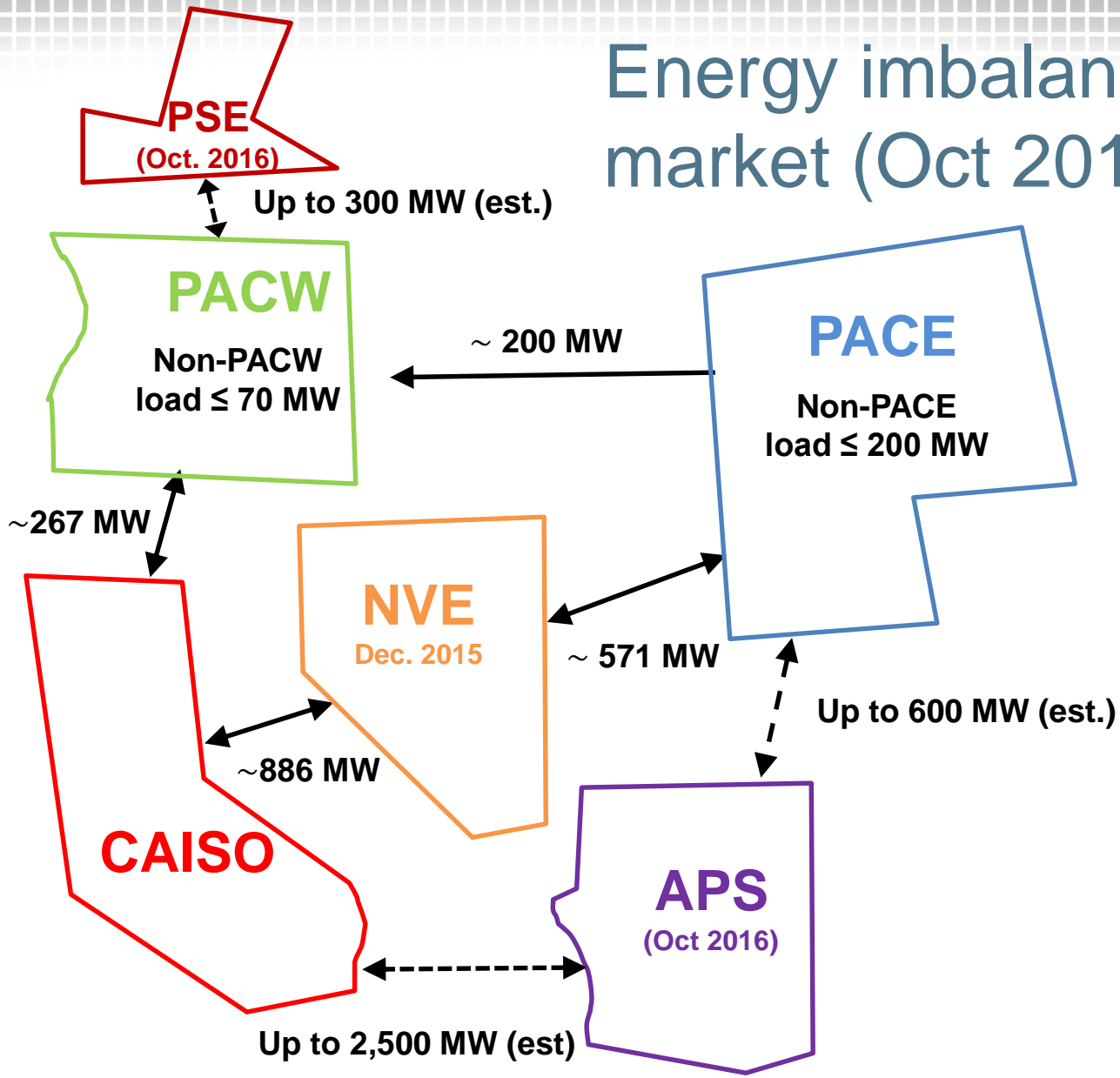
Key EIM market features and issues

- Key market drivers:
 - Base schedules/bids submitted by EIM entities
 - Available transmission for EIM transfer
 - Scheduling/software/systems issues at start-up
- Special price discovery mechanism triggered when insufficient market bids available in market software
 - Expired in PAC/PACW on March 23, 2016
 - In effect for first six months in NVE (through May 2016)
- New Available Balancing Capacity (ABC) feature and reporting requirements (March 23, 2016)
- Market power mitigation
 - Automated market power mitigation on EIM transfers
 - FERC requirement for PAC/NVE cost-based bids
 - Market power mitigation enhancements

Current energy imbalance market



Energy imbalance market (Oct 2016)



Net imports/exports by EIM area

December 2015 to March 2016 – 15-minute market

BAA	Net importer		Net exporter	
	Frequency	MW	Frequency	MW
CISO	64%	-205	36%	281
NEVP	80%	-246	20%	92
PACE	18%	-172	79%	217
PACW	34%	-116	65%	116

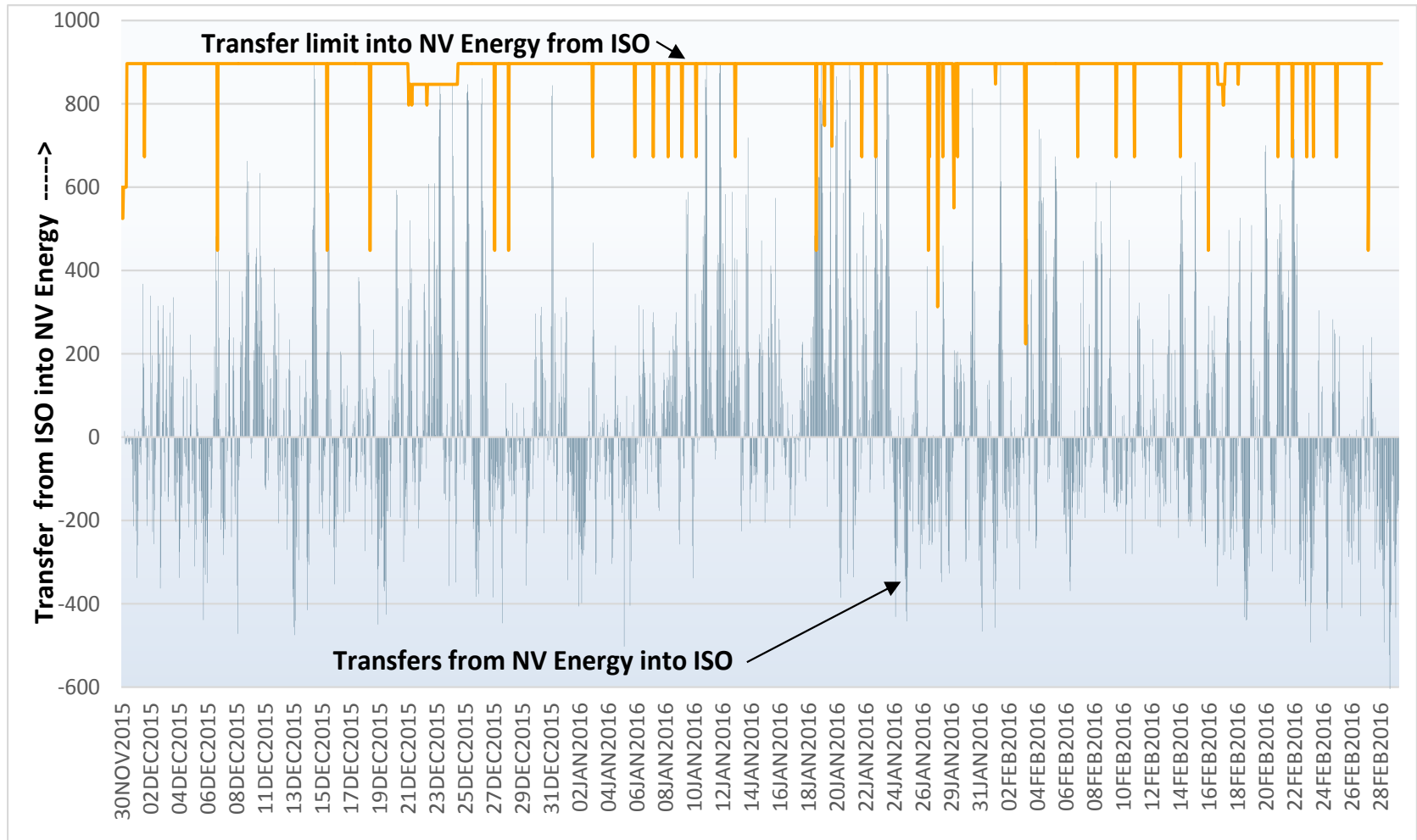
NVE and CISO have tended to be net importers, while PACE and PACW tend to be net exporters

Transfers limits have rarely been binding since addition of NVE

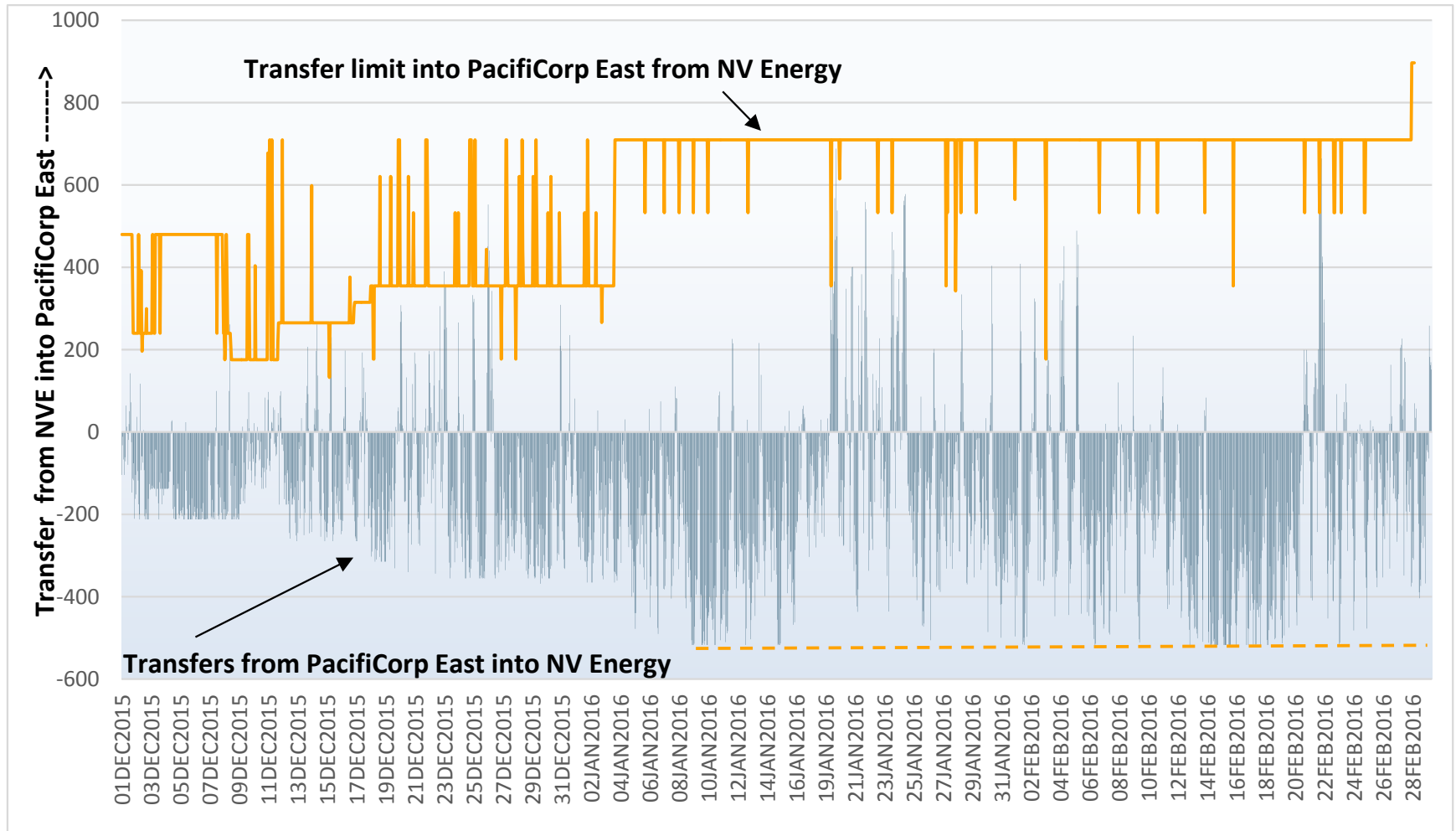
	Percent of intervals*	Average transfer from ISO (MW)
<u>NV Energy</u>		
Congested in from ISO	2%	745
Non-congested transfer from ISO	39%	237
Non-congested transfer into ISO	44%	-155
Congested out to ISO	2%	-226
<u>PacifiCorp East</u>		
Congested in from NVE only	0.3%	49
Congested in from ISO only	1.4%	302
Congested in from NVE and ISO	0.6%	315
Non-congested transfer from NVE	14%	150
Non-congested, transfer into NVE	80%	-237
<u>PacifiCorp West</u>		
Congested in from ISO	3%	116
Non-congested transfer from ISO	19%	109
Non-congested transfer into ISO	47%	-127
Congested out to ISO	18%	-140

* 15-minute market, Dec 2015 – February 2016

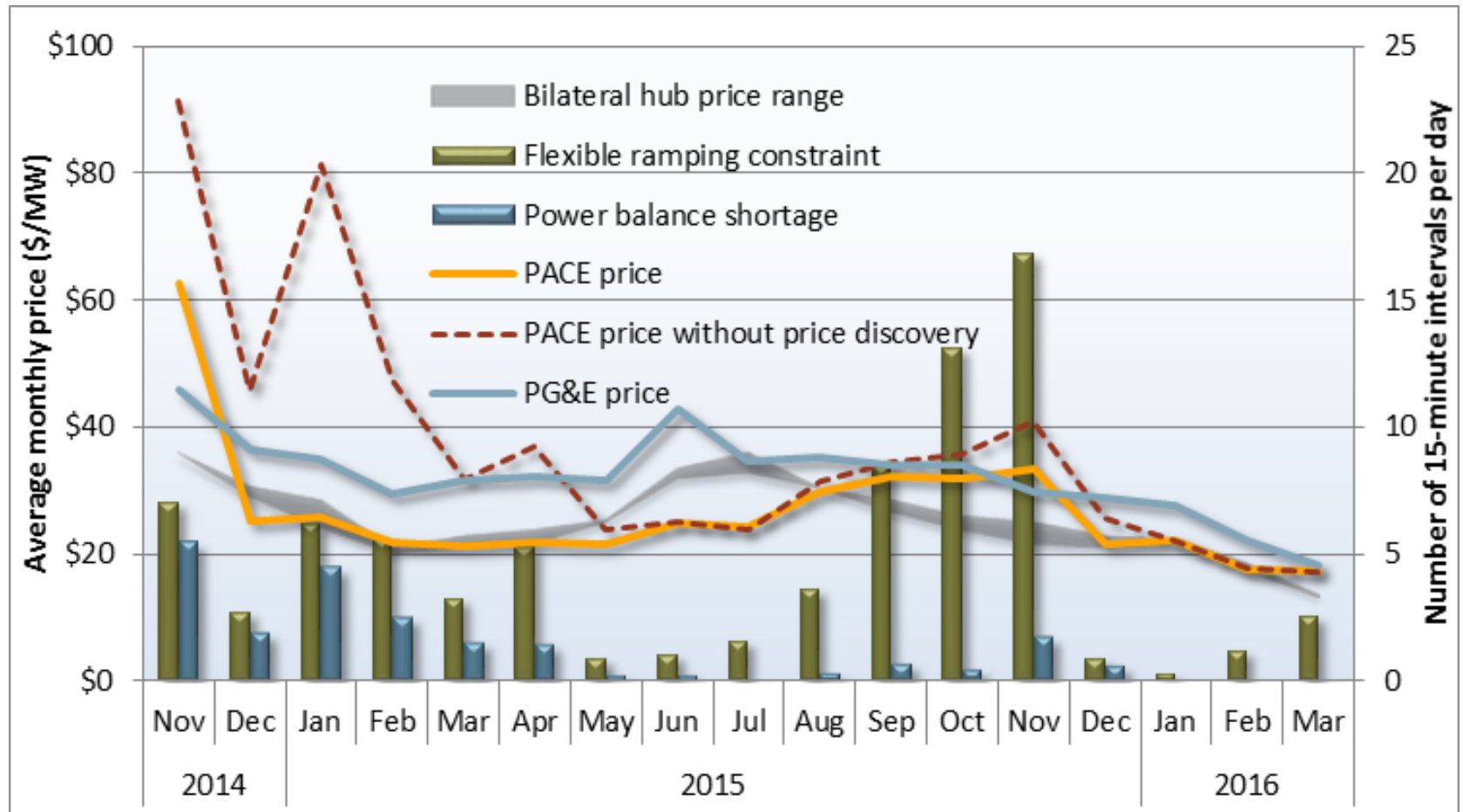
Transfers between ISO and NVE



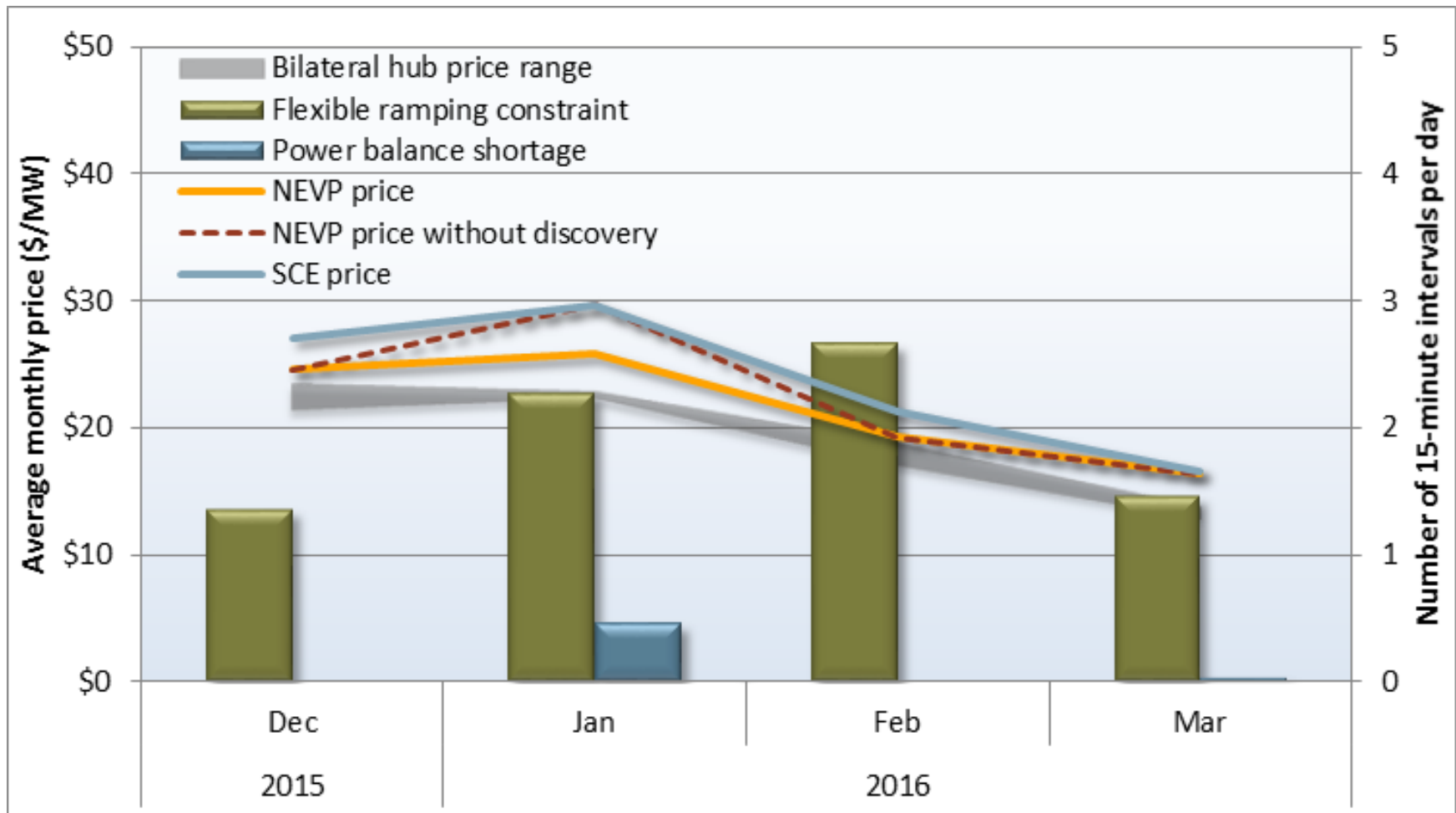
Transfers between NVE and PACE



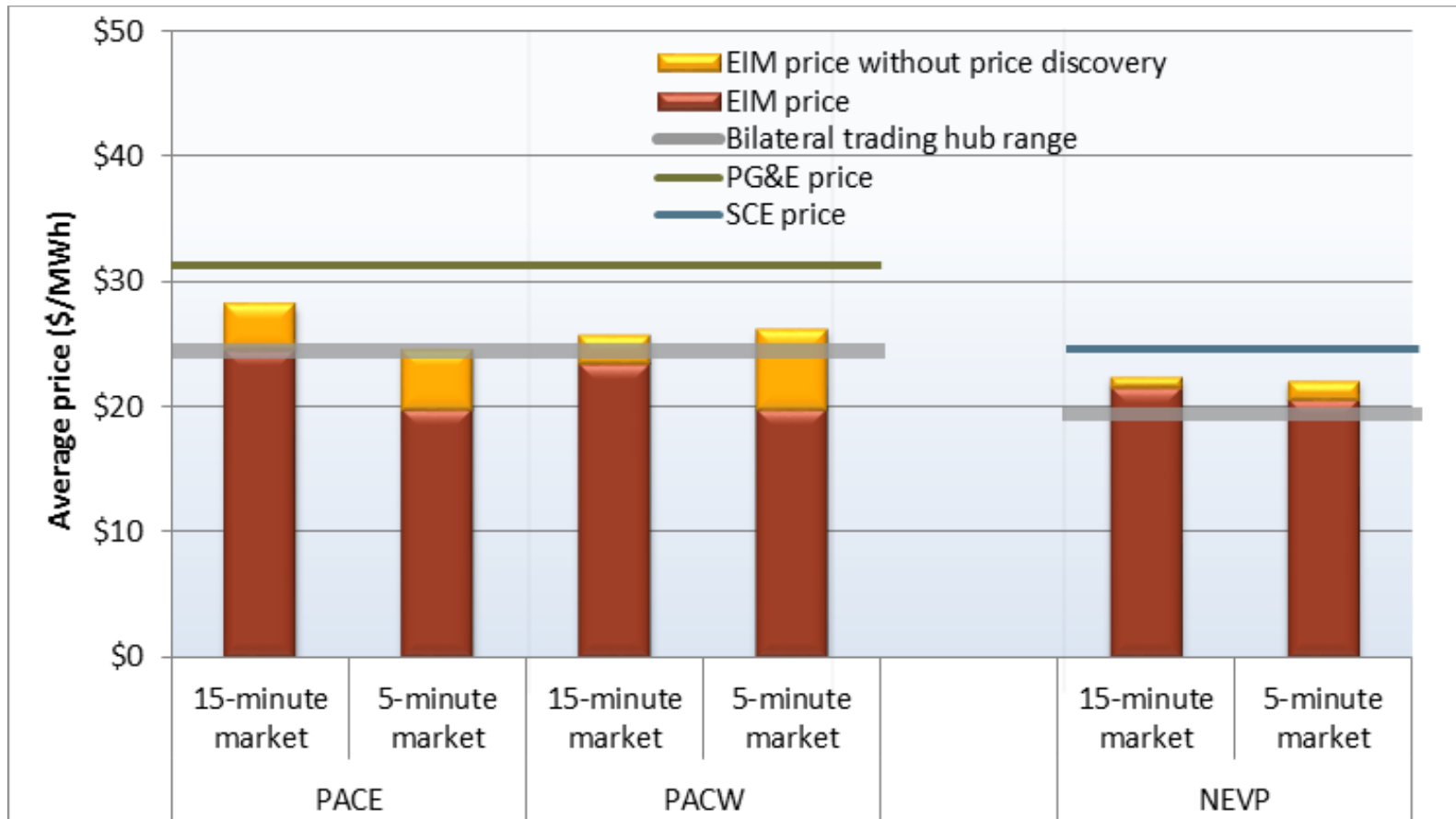
Performance in PAC areas has improved over time – especially after entry of NVE in Dec. 2015



EIM has performed very well in NV Energy area

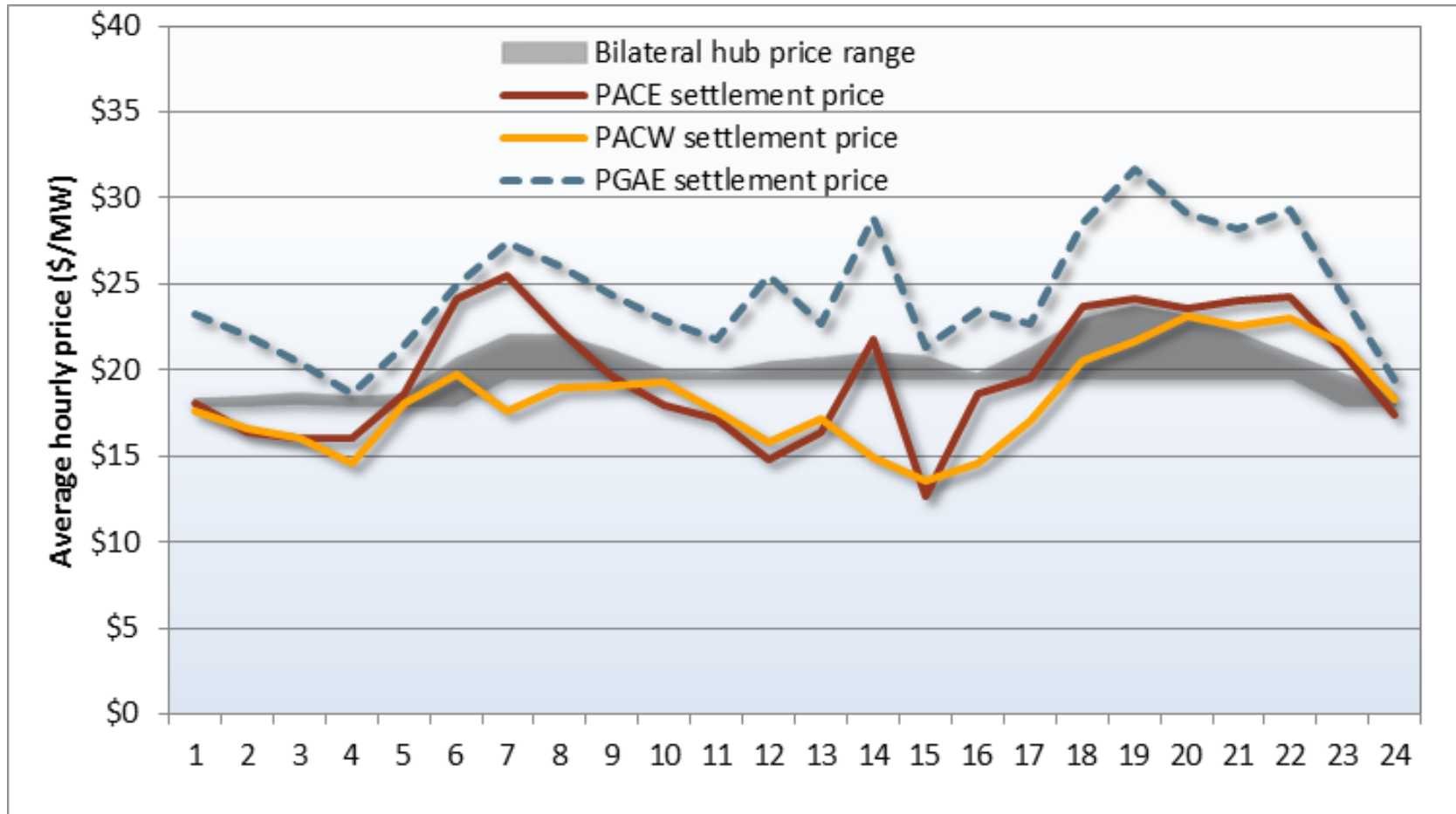


Overall EIM prices have been highly competitive – but special price discovery measures played important role mitigating 15-minute prices in PacifiCorp East.



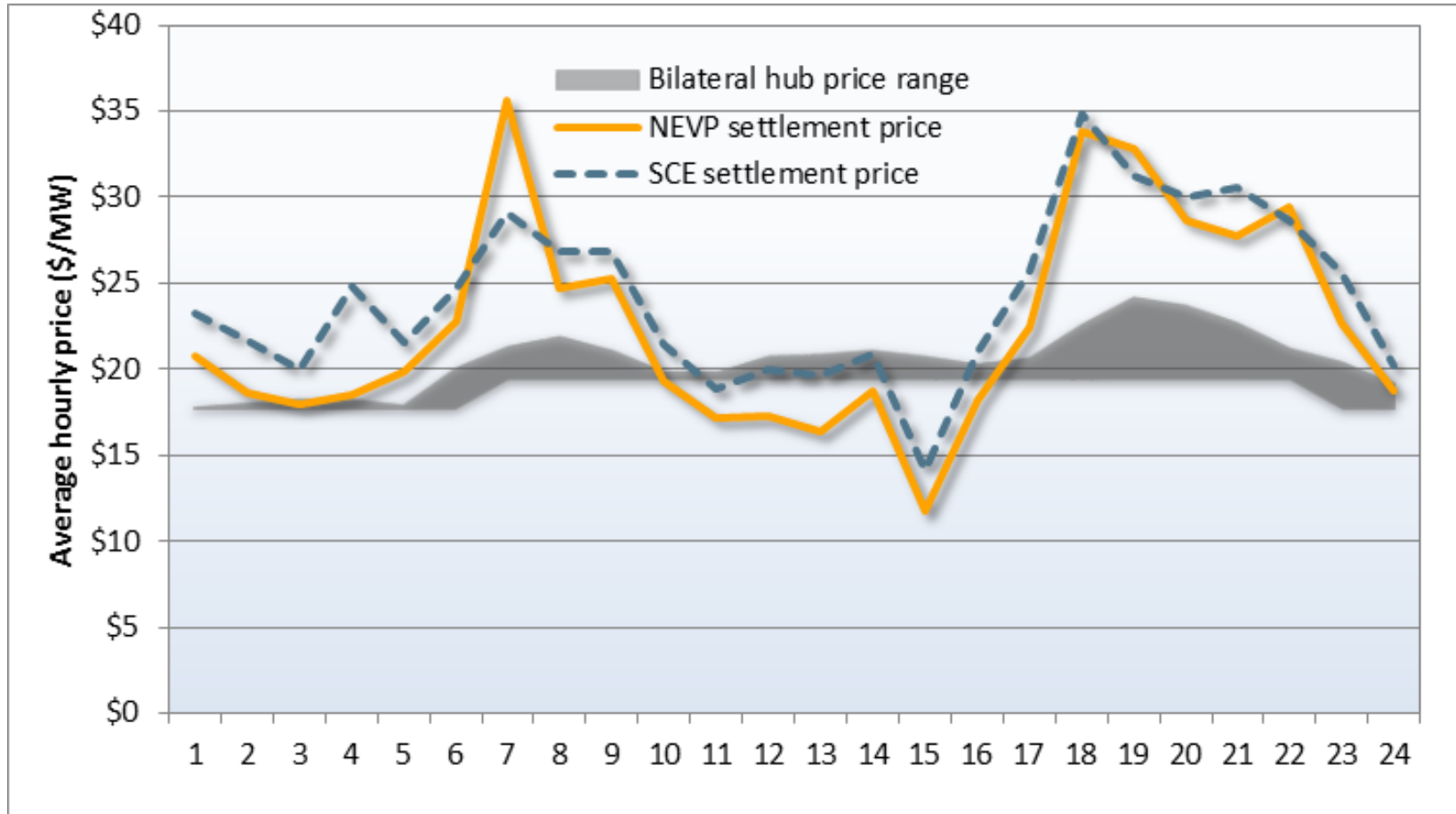
January 1, 2015 – March 31, 2016

Hourly pattern of EIM prices follows conditions in CAISO more closely than bilateral price indices.



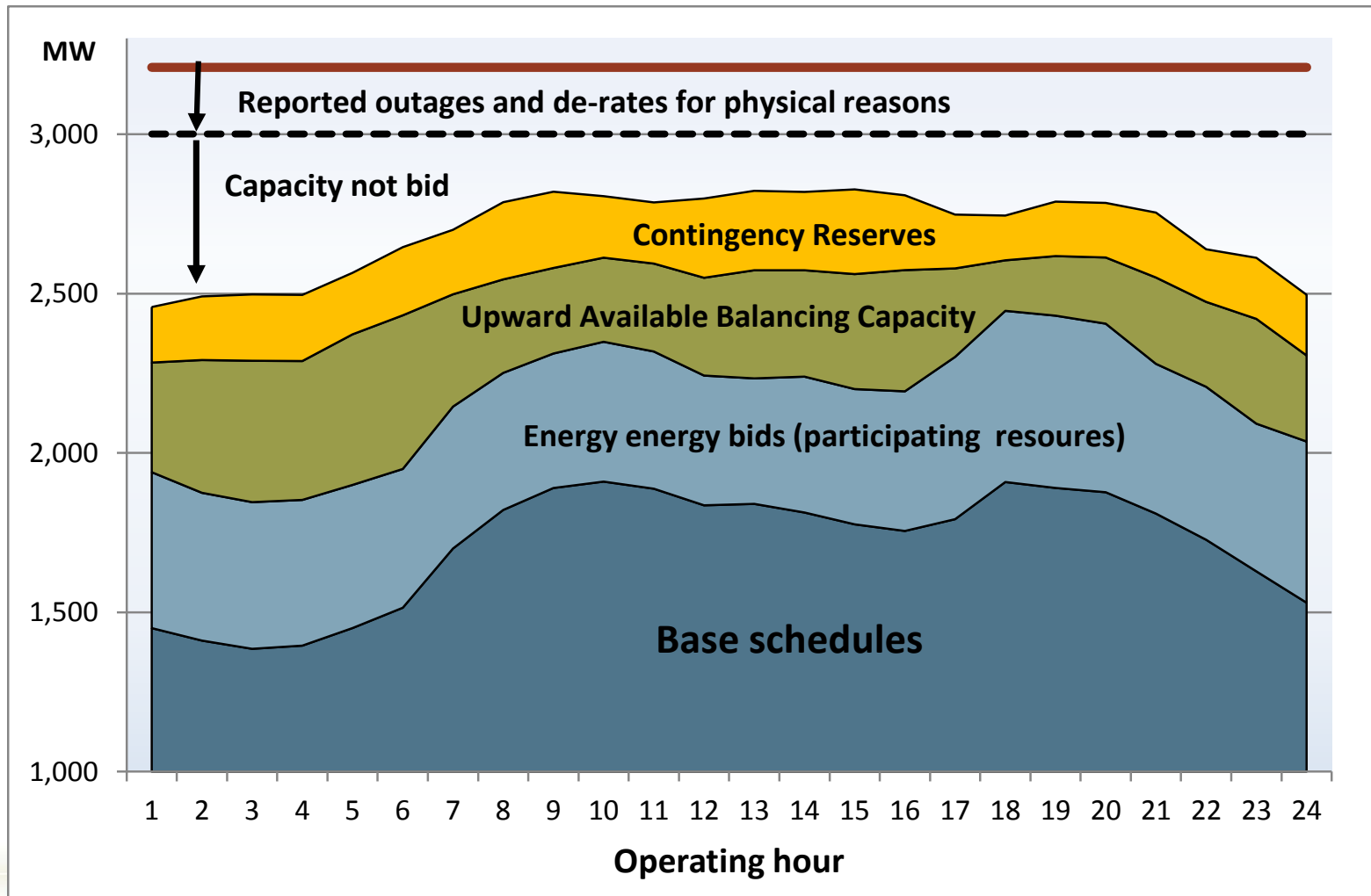
Dec 3, 2015 - March 13, 216 (without final price corrections for March)

Hourly pattern of EIM prices in NVE closely tracks solar-driven price pattern in SCE area

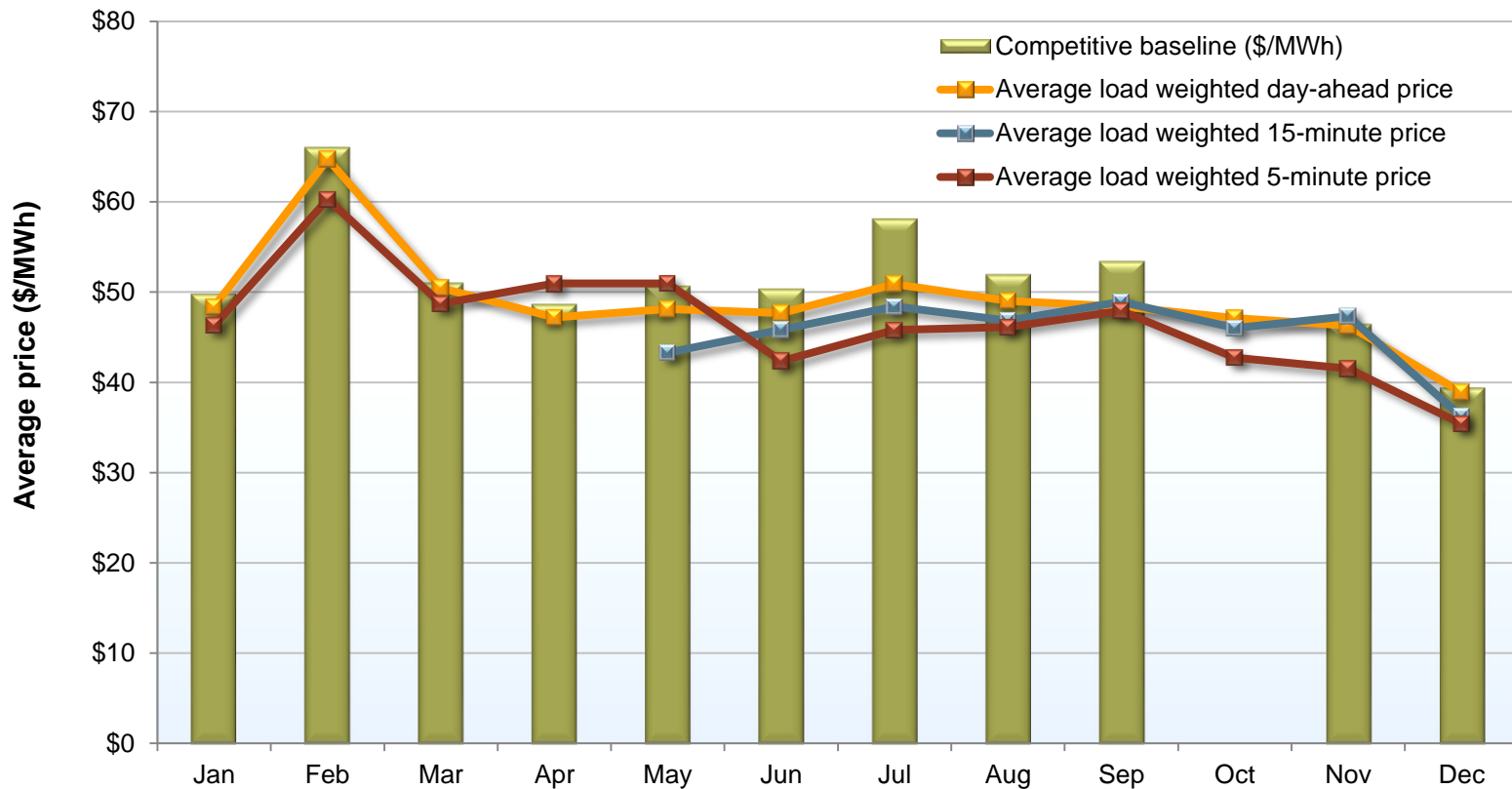


Dec 3, 2015 - March 13, 216 (without final price corrections for March)

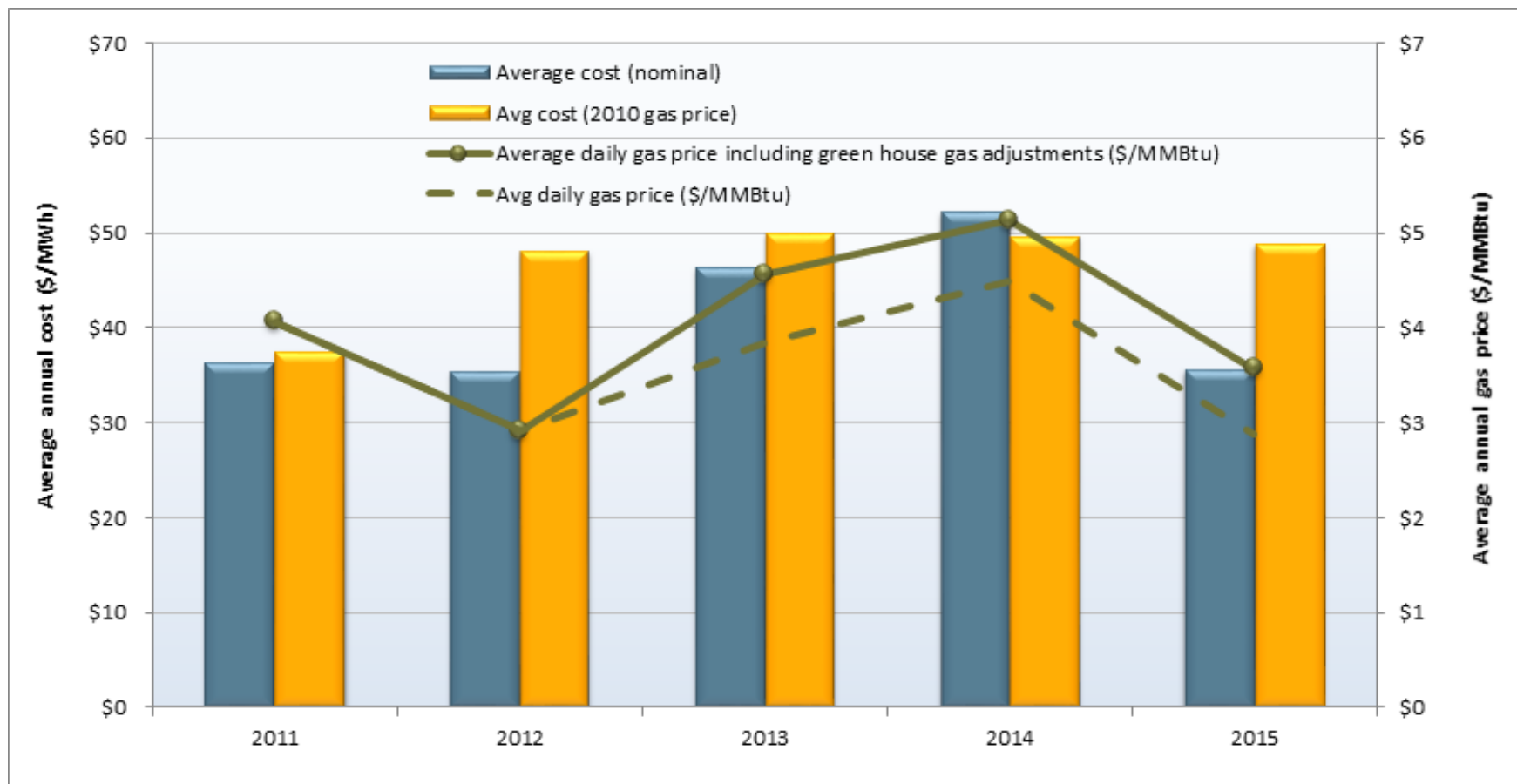
Energy imbalance market with recent enhancements (illustrative example)



DMM closely monitors market prices relative to competitive benchmark prices.



Total costs per MWh of ISO load served have been highly stable and competitive.



Useful links

- California ISO Appendix P:
http://www.caiso.com/Documents/AppendixP_CaliforniaISODepartmentOfMarketMonitoring_Jul1_2013.pdf
- Annual and quarterly reports:
<http://www.caiso.com/market/Pages/MarketMonitoring/MarketIssuesPerformanceReports/Default.aspx>
- Special energy imbalance market reports:
<http://www.caiso.com/market/Pages/MarketMonitoring/MarketIssuesPerformanceReports/Default.aspx>

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