

# MAXIMIZING VALUE OF GENCO ASSETS IN CAISO EIM MARKET

September 21-22, 2017  
Hyatt Regency Orange County  
Anaheim, CA



## OVERVIEW

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The purpose for this workshop is to discuss the potential benefits for participating in the new CAISO Energy-Imbalance market (EIM), review the bid-to-bill workflow for EIM market participants, and derive lessons learned for operating genco assets in the EIM market. The workshop will help you connect the dots between front-office bidding strategies and settlement results, and will provide case studies to illustrate how you can maximize the value of your generating assets and lower your costs for serving loads in the CAISO EIM market.

## LEARNING OUTCOMES

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**The seminar covers the following “hot” issues:**

- What are the main objectives for the new CAISO EIM Market?
- What are the potential costs and benefits for the EIM market?
- What are the lessons learned for operating generating assets in the EIM market?
- Can the EIM market be avoided while increasing solar or wind resources?
- Can the EIM market cause financial “pains” for selected market participants?
- If your company decides to stay out of the EIM market, but those around you join, how could it impact your operations?
- What are the lessons learned from other EIM market participants?
- How does the SCED engine work?
- How do you derive your base schedule?
- How do you create unit offers for combined-cycle plants, wind farms, solar plants, and cascaded hydro units?
- Can the EIM market work effectively for market participants that operate large cascaded hydro plants?
- What are the pros and cons for modeling your EIM resources as multi-state generators?
- How do you model Ancillary-Service Requirements (RegUp, RegDown, Spin, Non-Spin Reserve) in the EIM market?
- How do you model GHG Costs for your EIM resources?
- How should you operate your generating assets to maximize their value in the EIM market?
- What are the penalties for over/under scheduling?
- Do you receive any settlement charges for your non-participating resources?
- What data are needed to validate the CAISO EIM settlement statements and invoices?
- Why perform shadow settlement? Do you need to have your own shadow settlement software to check the ISO invoices?
- How can you validate bid-cost recovery payments for your generating assets in the CAISO EIM market?
- What are the main data sources to support shadow settlement?
- What are the main causes for settlement disputes? What is the best way for managing settlement disputes?
- How can you use settlement results to compute profit & loss metrics and provide feedback to traders on bidding strategies?
- What are the potential impacts of Market Power Mitigation on settlement results?
- Should you build a data warehouse to store settlement data?
- What IT infrastructure should you build to automate the bid-to-bill process?
- How can you best prepare your team (Front office, Back office, IT, Plant Personnel) for the new EIM market?

## WHO SHOULD ATTEND

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- Front-Office personnel who would like to understand the RT bidding workflow for their resources in the EIM market
- Back-office employees who need to gain a good understanding of the EIM settlement rules
- Power-plant managers who would like to understand the impact of EIM on their plant profitability
- IT personnel who need to build the IT infrastructure to support the bid-to-bill workflow
- Genco executives who need a good understanding of the impacts of the new EIM Market on their genco profits and losses
- Employees of ISO/RTOs, attorneys, and regulators who need to understand EIM market rules and mitigation guidelines

# COURSE TIMING

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THURSDAY, SEPTEMBER 21, 2017

- 7:30 – 8:00 am**      **Registration and Continental Breakfast**
- 8:00 am – 5:00 pm**      **Course Timing**
- 12:00 – 1:00 pm**      **Group Luncheon**

# PROGRAM AGENDA

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## **Lessons Learned for Operating Genco Assets in CAISO EIM Market**

- Objectives of CAISO Energy Imbalance Market
- Design Principles Behind CAISO EIM Market
- Key Market Players
- Understanding Full-Network Model and Commercial Model
- Market Terminology
- Key Responsibilities for EIM Participating Resources and EIM Entities
- Reviewing RT Bidding Workflow for EIM Market Participants
- How does Security-Constrained Economic Dispatch (SCED) Work?
- Bid-to-Bill Timeline & Challenges
- Lessons Learned from First 18 Months of EIM Market Operations
- Bid-to-Bill Timeline & Challenges
- Potential Impacts of EIM Market on Market Participants
- Frequently-Asked Questions about EIM Market



***“Excellent presentation on the EIM bidding workflow for EIM entities.”***

EIM Market Participant who attended seminar in Anaheim



***“This was one of the best presentations I’ve attended on EIM Markets. The PCI instructors were able to take complex subject matters and simplify the material so that the average person can understand it and gain a desire to learn more about the subject.”***

EIM Market Participant who attended seminar in Anaheim

# PROGRAM AGENDA

THURSDAY, SEPTEMBER 21, 2017 (CONTINUED)

## **Understanding Bid-to-Bill Workflow for EIM Market Participants**

- Reviewing Daily & Hourly Bidding Workflow in EIM
- Detailed Walk-Through an Hour on the EIM Clock (Bids, Awards, Dispatches, Imbalance Management, Updating Forecasts, Updating Outages)
- What-If Scenarios (What if a Plant Outage Occurs After T-40, What if Wind Forecast Changes after T-55, What if a Transmission Schedule Changes after the Start of the Hour, Etc.)
- Need to Forecast Hourly Loads
- Run Unit Commitment to Derive Hourly Balanced Resource Plan and Capacity Plan
- How do you model Ancillary-Service Requirements in EIM Market?
- Modeling GHG Costs in Bidding Process
- Submitting Resource and Capacity Plans to ISO
- Use Bid Formulation to Automatically Create Unit Offers
- Key Factors Influencing Unit Costs
- Modeling Combined-cycle and Other Resources as Multi-state Generators in EIM
- Operating Wind Farms and Cascaded Hydro Plants in EIM
- Use ISO Communications to Automate Data Exchange with ISO
- Deadline to submit Meter Data
- Timeline for Settlement Statements & Invoices
- Lessons Learned from Operating Participating and Non-Participating Resources in EIM Market

## **Using Settlement & P&L Metrics to Provide Feedback to Traders on EIM Market Operations**

- Using Settlement and Production-Costing Results to Compute EIM Profits & Losses (P&L) for your EIM Genco Portfolio
- Key Factors Influencing EIM Profits & Losses
- Using P&L Metrics to Provide Feedback to Traders on Effectiveness of EIM Bidding Strategies
- Using P&L Metrics to Identify when CAISO Dispatch May Not Be Optimal for your Generating Unit
- Using P&L Metrics to Validate CAISO Bid-Cost Recovery Payments
- Using P&L Metrics to Provide Feedback to Plant Managers on Plant Performance
- Settlement Forensics – Where Front and Back Offices Meet
- Lessons Learned for Using Business-Intelligence Tools to Analyze Settlement Results and Validate Market Operations



***“Very Knowledgeable instructors, excellent source of information.”***

EIM Market Participant who attended seminar in Las Vegas



***“All speakers were very knowledgeable and successful in sharing this knowledge.”***

EIM Market Participant who attended seminar in Bellevue

# COURSE TIMING

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FRIDAY, SEPTEMBER 22, 2017

<b>7:30 - 8:00 am</b>	<b>Continental Breakfast</b>
<b>8:00 am – 4:00 pm</b>	<b>Course Timing</b>
<b>12:00 – 1:00 pm</b>	<b>Group Luncheon</b>

# PROGRAM AGENDA

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## **Validating EIM Settlement Statements and Invoices**

- Settlement Workflow for CAISO EIM Market
- Understanding Key Charge Codes for CAISO EIM Market
- Computing Energy Imbalances for Resources, Imports, Exports, and Loads
- Validating GHG Payments for EIM Resources
- Validating Bid-Cost Recovery (BCR) Payments
- Computing Over/Under Scheduling Penalties
- Understanding EIM Admin Charges
- Downloading Settlement Statements and Invoices
- Why Perform Shadow Settlement?
- Key Functions of Shadow Settlement Software
- What Lessons can you Learn from Settlement Disputes?
- Managing Settlement Disputes

## **Roles for EIM Entities**

- Understanding Role of EIM Entity in CAISO EIM Market
- BA Responsibilities Before and After EIM Market
- Reviewing Day-Ahead & Hourly Bidding Workflow for EIM Entity
- BA Requirement to Submit Balanced Schedules
- Examples Illustrating how CAISO Checks to Make Sure that Base Schedule is Balanced, Meets Flexible-Ramp Constraints, and Free of Congestion
- BA Penalties for Over and Under Scheduling
- Settlement Workflow for EIM Entity in CAISO EIM Market
- Transmission Limits and Rates Used in EIM Market
- Modeling Transmission Limits in SCED Engine
- Submitting Dynamic ETags to Reserve Transmission for EIM Transfers
- Interfacing with CAISO IT Platform to Support EIM Bid-to-Bill Workflow

## **Uses of Locational Marginal Prices in Bidding & Settlement**

- Using Full Network Model to Compute Nodal Locational Marginal Prices
- How are LMPs computed?
- Understanding 4 Components of LMPs: Energy, Loss, Congestion, and GHG
- Understanding Impacts of Flowgates on Congestion
- Can LMPs be Negative?
- Real-Time Settlement Calculations

# PROGRAM AGENDA

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FRIDAY, SEPTEMBER 22, 2017 (CONTINUED)

## **Understanding Market Mitigation**

- CAISO Objectives for Market Monitoring
- Rules for Local Market Power Mitigation
- Market Mitigation Scenarios

## **Preparing for New CAISO EIM Market**

- Preparing for CAISO EIM Market
- What Software Tools and IT Infrastructure do you Need to Automate your Bid-to-Bill Workflow in the CAISO EIM Market?
- Training Key Personnel (Traders, Power-Plant Managers, Fuel Procurement, Risk Managers, Load Forecasters, etc...) for Market-Based Operations
- Reviewing Lessons Learned from other EIM Market Participants
- What are the Key Risks in the New EIM Market?

## **Course Review & Round-Table Discussion**



*“Very well done course! Lots of good information packed in 2 days!”*

EIM Market Participant who attended seminar in Anaheim



*“Seminar was extremely informative and it was a lot of fun as well.”*

EIM Market Participant who attended workshop in Portland

## COURSE INSTRUCTORS

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### Khai Le

*Sr. Vice President, PCI*

Over the past 40 years, Khai Le has conducted over 700 seminars on market-based operations, bidding strategies, portfolio optimization, and shadow settlement for utilities and ISOs worldwide. He is currently working with market participants in CAISO, MISO, SPP, PJM, ISO-NE, and ERCOT to deploy the PCI Generation Supply Management System (PCI GenManager, PCI GenTrader and PCI GenPortal) to automate their bid-to-bill workflow. Khai authored over 100 technical papers on unit commitment, hydro-thermal coordination, emission dispatch, optimization of ancillary services, post analysis, and short-term planning. Five of his papers received prize awards. Khai received his BS from Harvey Mudd College and his MS from Carnegie Mellon University. He is a Fellow of the IEEE and a Registered Professional Engineer in Pennsylvania.

### Tony Delacluysse

*Sr. Director, PCI*

Tony Delacluysse is a well-recognized authority on EIM markets. He has over 30 years of experience that includes power plant operations, origination, pricing, deregulated retail, settlements, RTO operations. After joining PCI in 2005, he managed the PCI team to develop back-office software for MISO, SPP, ERCOT, CAISO and PJM markets. Tony participates in RTO market meetings, monitors the industry and FERC for market impacts and works with markets participants on planning, software, and strategy. He received both his BA and MBA from St Ambrose University.

### Justin Shearer

*Manager, PCI*

Justin Shearer actively manages all phases of CAISO product development including analysis, design, development, testing, support and training. Justin has been deeply involved with the deployment of the PCI EIM suite at NV Energy, Arizona Public Service, Puget Sound Energy, and Portland General Electric. Justin actively participates in the CAISO EIM and MRTU working groups. Justin received both his BA and MBA from the University of Oklahoma.

### Praveen Allaka

*Technical Consultant, PCI*

Praveen is involved in the implementation of the PCI EIM suite at a number of EIM clients. He specializes in automating bidding workflows for EIM entities. Praveen received his Bachelor's degree from Osmania University and his Masters degree from Oklahoma State University.

### Mark Rothleder

*Vice President, CAISO (Guest Speaker)*

Mark has been closely involved with the design and implementation of both MRTU and EIM markets in CAISO. Before being named vice president, he was Executive Director of Market Analysis and Development. Mark received his B.S. degree in Electrical Engineering from California State University and is a registered Professional Electrical Engineer in the state of California.

## REQUIREMENTS FOR SUCCESSFUL COMPLETION

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Participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for continuing education credit.

## INSTRUCTIONAL METHODS

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Case studies and PowerPoint presentations will be used in this program.

## PROCEEDINGS

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The proceedings of the course will be published, and one copy will be distributed to each registrant at the course.

## EVENT LOCATION

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A room block has been reserved at the Hyatt Regency Orange County, 11999 Harbor Blvd, Garden Grove, CA 92840, for the nights of September 20 - 21, 2017. Room rates are \$159, plus applicable tax. Call **1-714-750-1234** for reservations and mention the EUCL event to get the group rate. The cutoff date to receive the group rate is August 20, 2017 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

## IACET CREDITS

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EUCL has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCL has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCL is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

**EUCL is authorized by IACET to offer 1.6 CEUs for the conference.**

## CPE CREDITS

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EUCL is registered with the National Association of State Boards of Accountancy (NASBA) as a sponsor of continuing professional education on the National Registry of CPE Sponsors. State boards of accountancy have final authority on the acceptance of individual courses for CPE credit. Complaints regarding registered sponsors may be submitted to the National Registry of CPE Sponsors through its website: [www.learningmarket.org](http://www.learningmarket.org).

Upon successful completion of this event, program participants interested in receiving CPE credits will receive a certificate of completion. EUCL is authorized by CPE to offer 18.5 credits for the conference.

There is no prerequisite for this course.

**Program Level:** Beginner/Intermediate

**Delivery Method:** Group-Live

**Advanced Preparation:** None

## REGISTER 3, SEND THE 4TH FREE

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Any organization wishing to send multiple attendees to this event may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.





Please make checks payable to: "PMA"

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## PLEASE REGISTER

- **MAXIMIZING VALUE OF GENCO ASSETS  
IN CAISO EIM MARKET COURSE**  
 SEPTEMBER 19, 2017: US \$1595,  
 Early bird on or before September 1, 2017: US \$1395

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name Job Title

Company

What name do you prefer on your name badge?

Address

City State/Province Zip/Postal Code Country

Phone Email

List any dietary or accessibility needs here

### CREDIT CARD INFORMATION

Name on Card Billing Address

Account Number Billing City Billing State

Exp. Date Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx) Billing Zip Code/Postal Code

**OR** Enclosed is a check for \$ \_\_\_\_\_ to cover \_\_\_\_\_ registrations.

### Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before August 18, 2017 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at (201) 871-0474.