California ISO
Shaping a Renewed Future

Briefing on Energy Imbalance Market

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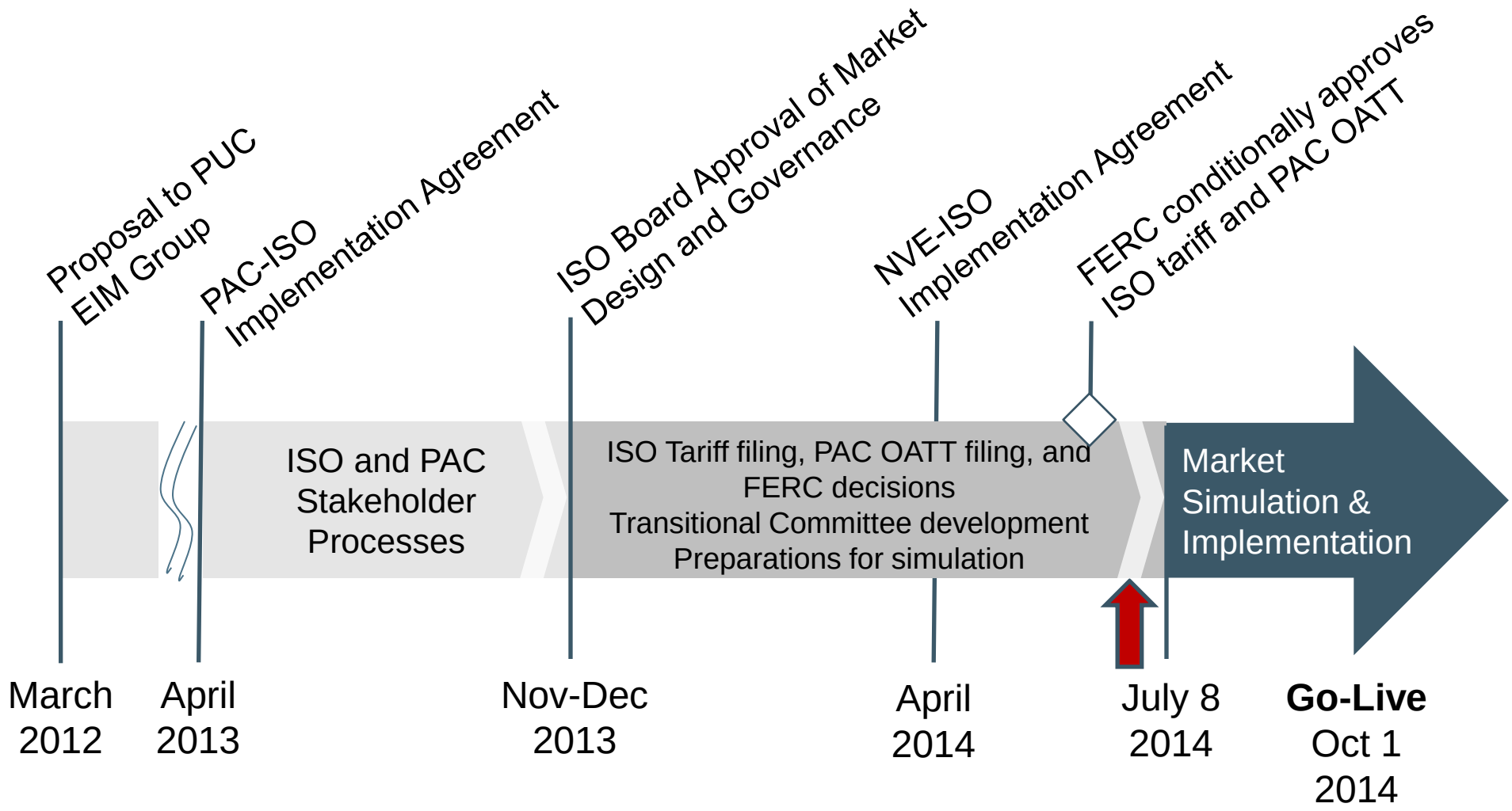
EIM Transitional Committee Meeting
General Session
July 1, 2014

Agenda

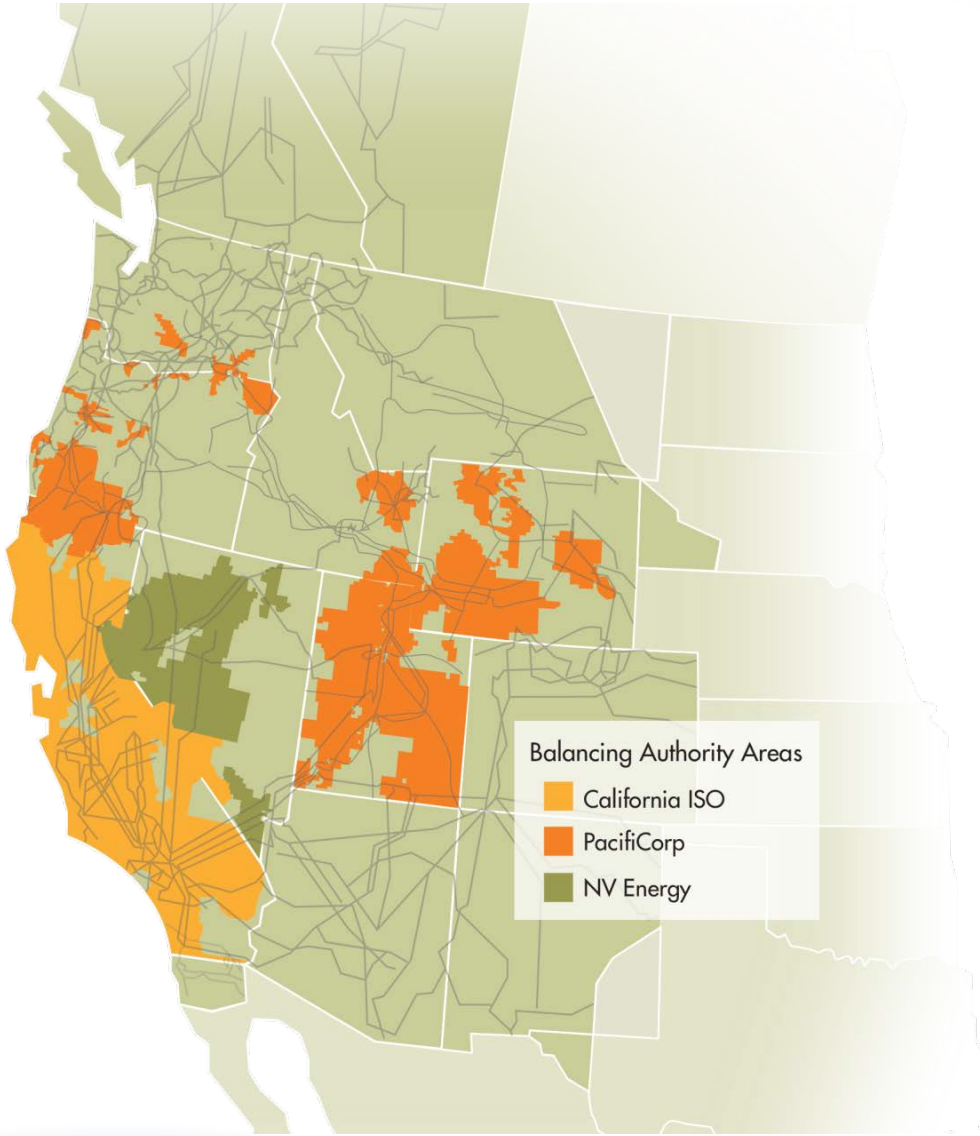
- EIM Overview
- Summary of recent FERC orders (California ISO and PAC)
- Status of EIM Implementation

EIM history and process



Energy Imbalance Market is scalable

- Builds on existing market platform
- No critical mass required
- Easily scalable, offering low-cost, low risk option to new entities
- No exit fees
- Preserves BAA autonomy, including compliance, balancing, and reserve obligations
- PacifiCorp go-live Oct 2014
- NV Energy go-live Oct 2015



Benefits of an Energy Imbalance Market

- Enhances the ability to integrate renewable resources by dispatching every five minutes

- Provides reliability and economic benefits to all participants
  - Enhances reliability through real-time visibility across all balancing authorities
  - Captures benefits of geographical diversity of load and resources
  - Balances in real-time with least cost generation

EIM provides significant net benefits

	ISO/PacifiCorp study (in millions)	ISO/NV Energy study on incremental benefits (in millions)
annual benefits	$21.4 - $129.0	$9.0 - $18.0 (2017)
		$15.0 - $29.0 (2022)
start-up costs	approx. $20.0 ($2.5 to ISO)	approx. $11.20 ($1.10 to ISO)
annual on-going costs	approx. $3.00	approx. $2.60

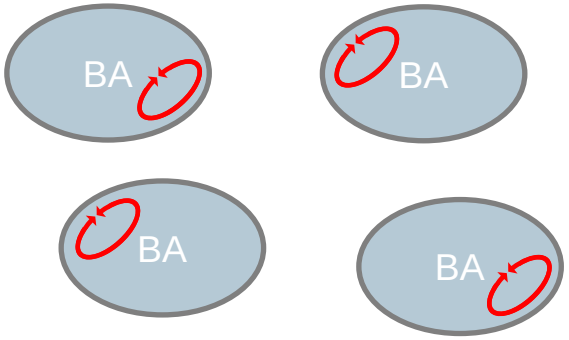
- Reliability benefits outlined in FERC staff paper on qualitative assessment of reliability benefits of EIM:
  - http://www.caiso.com/Documents/QualitativeAssessment-PotentialReliabilityBenefits-WesternEnergyImbalanceMarket.pdf

What is “imbalance” and how does EIM help

- Balancing authorities (BA) start the hour with matched generation and forecasted load
- Imbalances are load and generation deviations that occur within hour
- All BAs have responsibility to maintain operating reserves for contingency events
- Most BAs procure extra flexibility reserves to balance variable supply and demand
- Security constrained economic dispatch:
  - Finds least cost resource mix to solve imbalance
  - Avoids congestion
  - Dispatches resources automatically

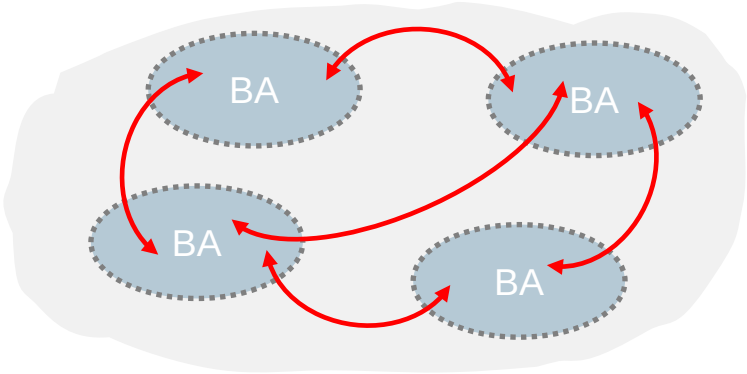
Today vs. EIM

Today:
Each BA must balance loads and resources w/in its borders.



- Limited pool of balancing resources
- Inflexibility
- High levels of reserves
- Economic inefficiencies
- Increased costs to integrate wind/solar

In an EIM:
The market dispatches resources across BAs to balance energy

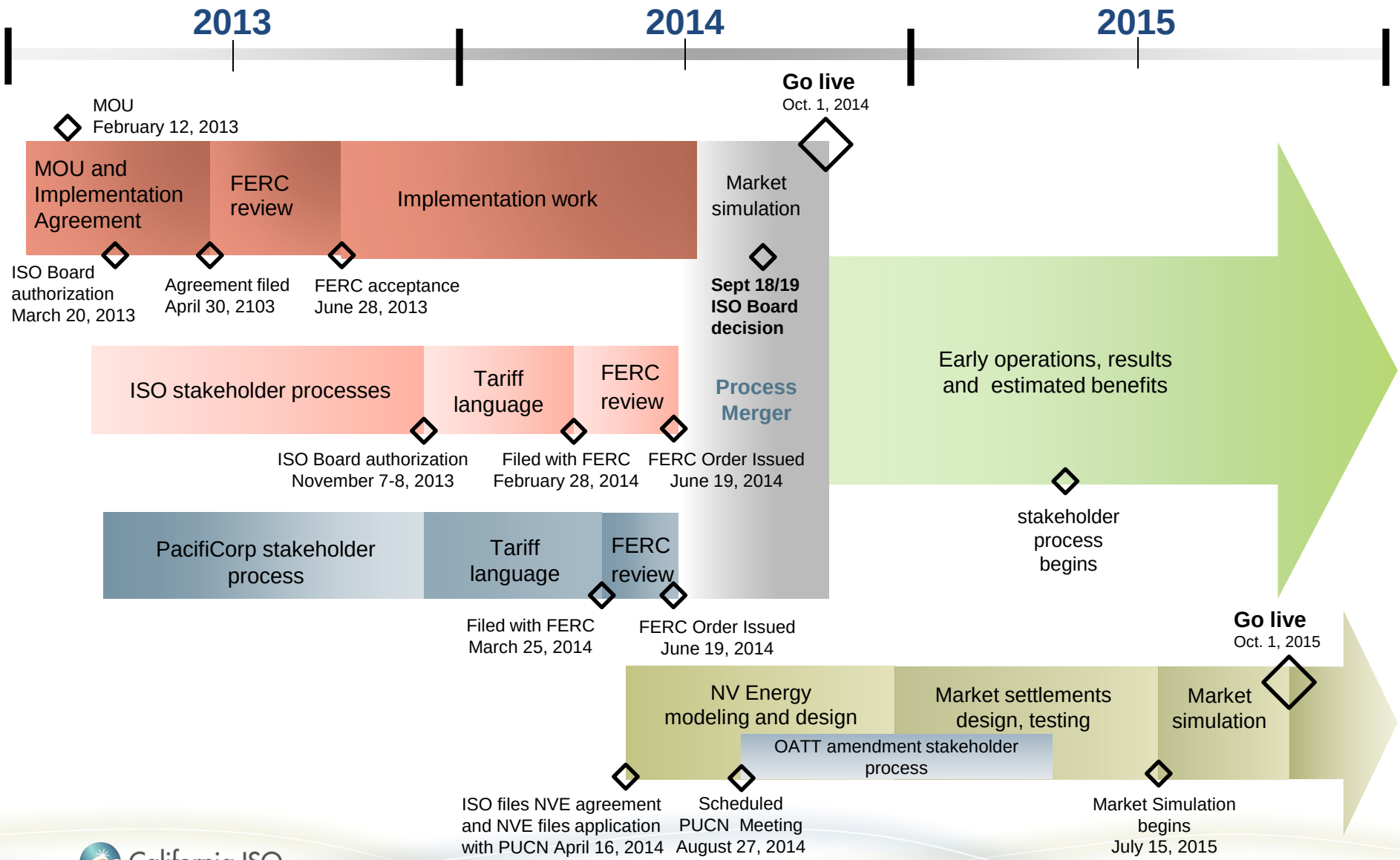


- Diversity of balancing resources
- Increased flexibility
- Decreased flexible reserves
- More economically efficient
- Decreased integration costs

EIM extends ISO real-time market functionality to EIM participants

- Dispatch accounts for operating characteristics and constraints of participating resources
- ISO offers advanced variable energy resource (VER) forecasting and scheduling
- Optimizes 15-minute and 5-minute dispatch
- Congestion management
- Efficient use of transmission offered by EIM entity

EIM implementation milestones and status



California ISO

FERC ORDER SUMMARY

The EIM framework remains intact and supports implementation of PacifiCorp and other participants

- Accepted proposal not to impose a separate transmission charge for EIM transfers
- Rejected Board discretion to include EIM intertie transfer constraints in market power mitigation procedures
- Directed implementation of a flag for EIM resources to opt out of transferring energy to California
- Accepted the ISO's approach to address concerns that the EIM raised seams issues
- Accepted the ISO's governance and market monitoring function as appropriate for the EIM
- Directed information filing for structural competiveness

There were several other important items that FERC accepted without condition

- Resource sufficiency or “leaning”
- Allocation of uplift charges based on EIM transfers
- Virtual bids allocated cost contribution to EIM constraints
- Settlements and billing according to the ISO tariff
- Administrative fee charged to EIM participants
- Treatment of confidential information
- Other items not challenged in the proceeding

There are several items that were conditionally accepted subject to a compliance filing

- Central counterparty role clarification
  - Compliance filing within 30 days
- Administrative fee calculation clarification
  - Compliance filing within 30 days
- Business Practice Manual (BPM) development
  - ISO working with stakeholders to develop EIM BPM
- Congestion offset charge clarification
  - Compliance filing within 30 days
- Other miscellaneous clarifications
  - Compliance filing within 30 days

PacifiCorp

FERC ORDER SUMMARY

FERC also provided broad acceptance of PacifiCorp's OATT revisions

- Accepted use of LMP pricing for imbalance service provided under OATT Schedules 4 and 9
- Approved designation of two LAPs in PacifiCorp's BAAs – but required review within one year of EIM go-live
- Allowed transmission customers to make firm transmission rights over PacifiCorp's system available for EIM transfers through use of the Interchange Rights Holder concept, but required more detail on scheduling requirements be included in PacifiCorp's OATT
- Rejected ability of EIM Entity to temporarily suspend EIM due to a market design flaw, which would have provided opportunity for filing to correct flaw and resume market

Certain provisions are required to be included in a compliance filing

- Direct PacifiCorp to eliminate additional transmission charge for EIM transactions for participating resources in its BAAs
- Revise Schedule 10 to financially settle losses using LMP instead of hourly pricing proxy
- Require PacifiCorp to incorporate changes it agreed to make in its Answer
  - Further explain application of the load ratio share billing determinant for over- and under-scheduling penalties
  - Clarify definitions in response to comments
  - Provide additional language addressing the applicability of Attachment T to legacy contracts

Several future items to be studied and addressed in future filings at FERC

- File within 30 days of conclusion of the EIM business practice stakeholder process any necessary additions to the OATT
- Post the current version of all ISO provisions referenced in the OATT, as well as give notice when ISO files a proposal to amend such provisions, on its OASIS
- Identify each EIM-related charge in the annual transmission formula rate filing
- File a market-based rate change of status filing within nine months of EIM launch to give FERC an opportunity to review market power in the EIM

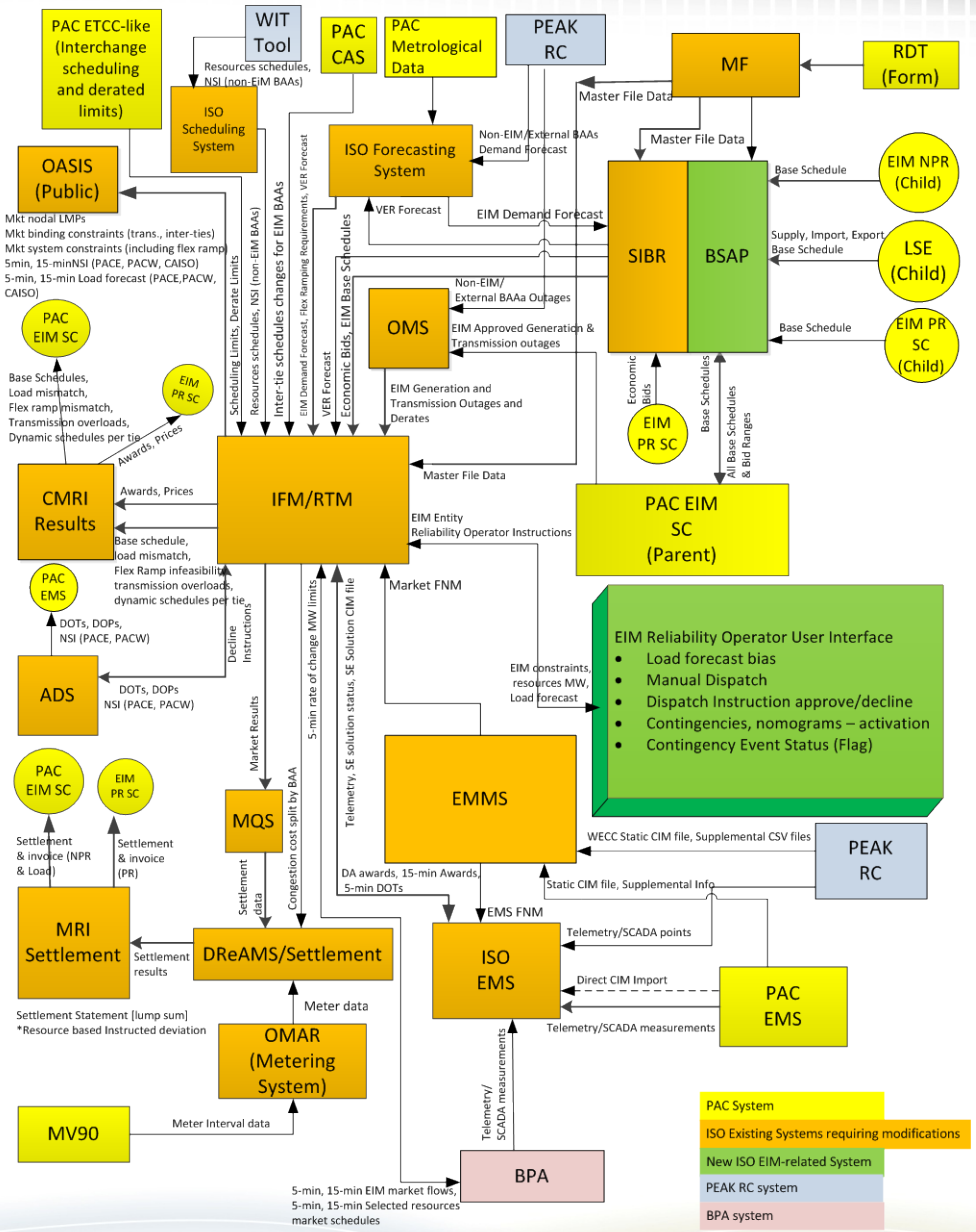
Khaled Abdul-Rahman

Executive Director, Power Systems and Smart Grid Technology Development

STATUS OF IMPLEMENTATION

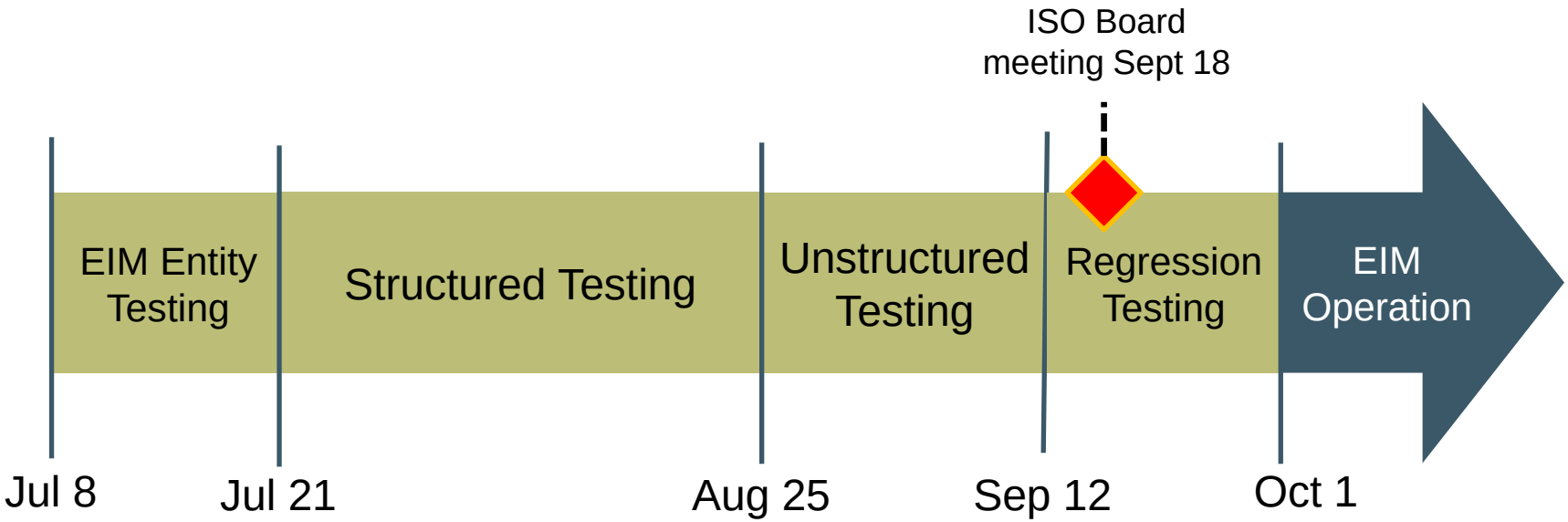
EIM Network Model and System Changes

- New systems:
  - o Base schedule aggregation portal (BSAP)
  - o EIM Reliability Operator User
- Network model includes PacifiCorp region
- Integration and functional testing underway



Last change: 5/22/2014

Market Simulation July 8-Sep 12



- Regular participant conference calls
- Simulation will also test benefit metric models
- Market Simulation plan posted on ISO website:
  http://www.caiso.com/Documents/Fall2014ReleaseMarketSimulationPlan.pdf

EIM Operations Readiness

- Market desk staff selected
- PAC and ISO operators started user interface validation
- PAC and ISO Operators provided positive feedback on the EIM displays
- Procedures and market simulation scenarios reviewed
- Draft EIM Business Practice Manual

Questions