California ISO
Shaping a Renewed Future

Briefing on full network model expansion and decision on EIM implementation

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Full network model expansion project

FNM stakeholder process 4/10/13 – 1/30/14

Board approval 2/6/14

FERC Order 7/31/14

FNM Expansion project 2013 – 10/01/14

March – September 2014

- **FNM Design**
- **FNM Implementation**
- **FNM Market Simulation**
- **FNM Testing**

Full Network Model

- ISO network model is expanded to model unscheduled flow in the day-ahead market
- Include detailed model for EIM-participating BAAs
- Include sufficiently detailed model between and surrounding ISO and EIM-participating BAAs
- Phased expansion conditional on available telemetry and outage information
  - Reasonably accurate State Estimator solution
- Ultimate goal: entire WECC in the model

BAAs modeled in FNM

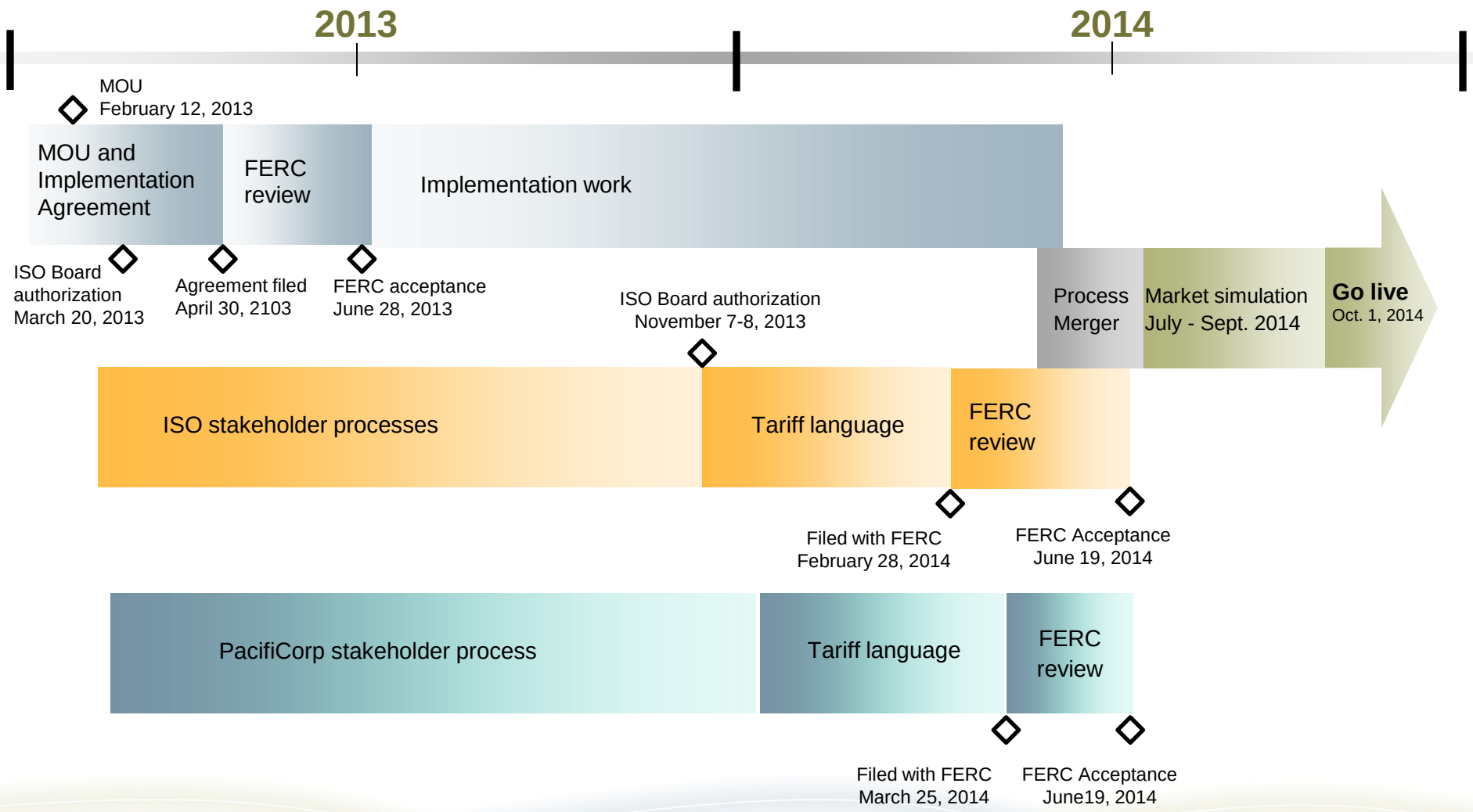
- ISO (PG&E, SCE, SDGE, VEA)
- PACE, PACW
- 23 other western BAAs using PEAK RC model or ISO EMS model.
  - (BANC, LDWP, IID, TIDC, ARIZ, PSCO, WACM, IPCO, NEVP, WALC, AVA, BPAT, CHPD, DOPD, GCPD, PGE, PSEI, SCL, TPWR, CFE, PNM*, NWMT*, BCHA*)

* only tie substations with injections

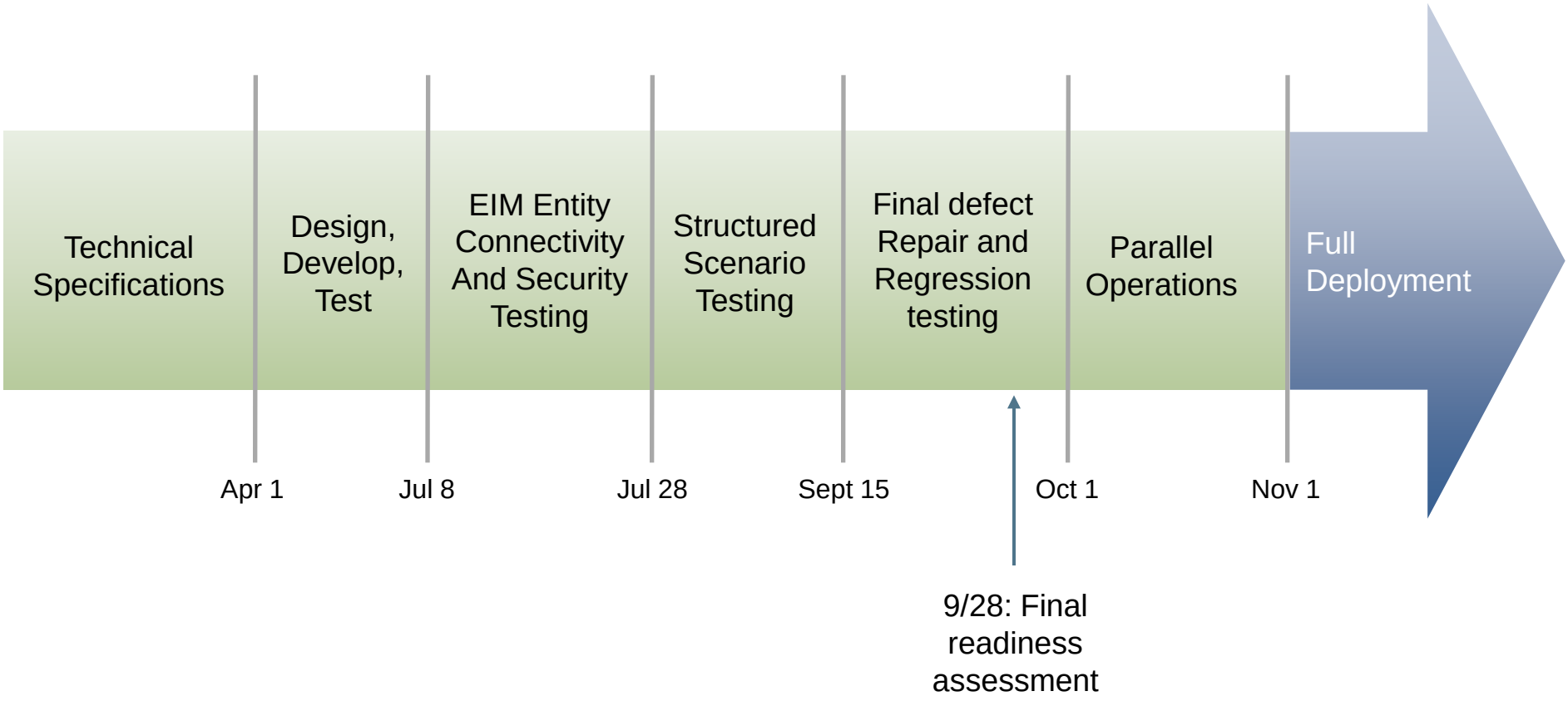
External BAAs Nodal Data

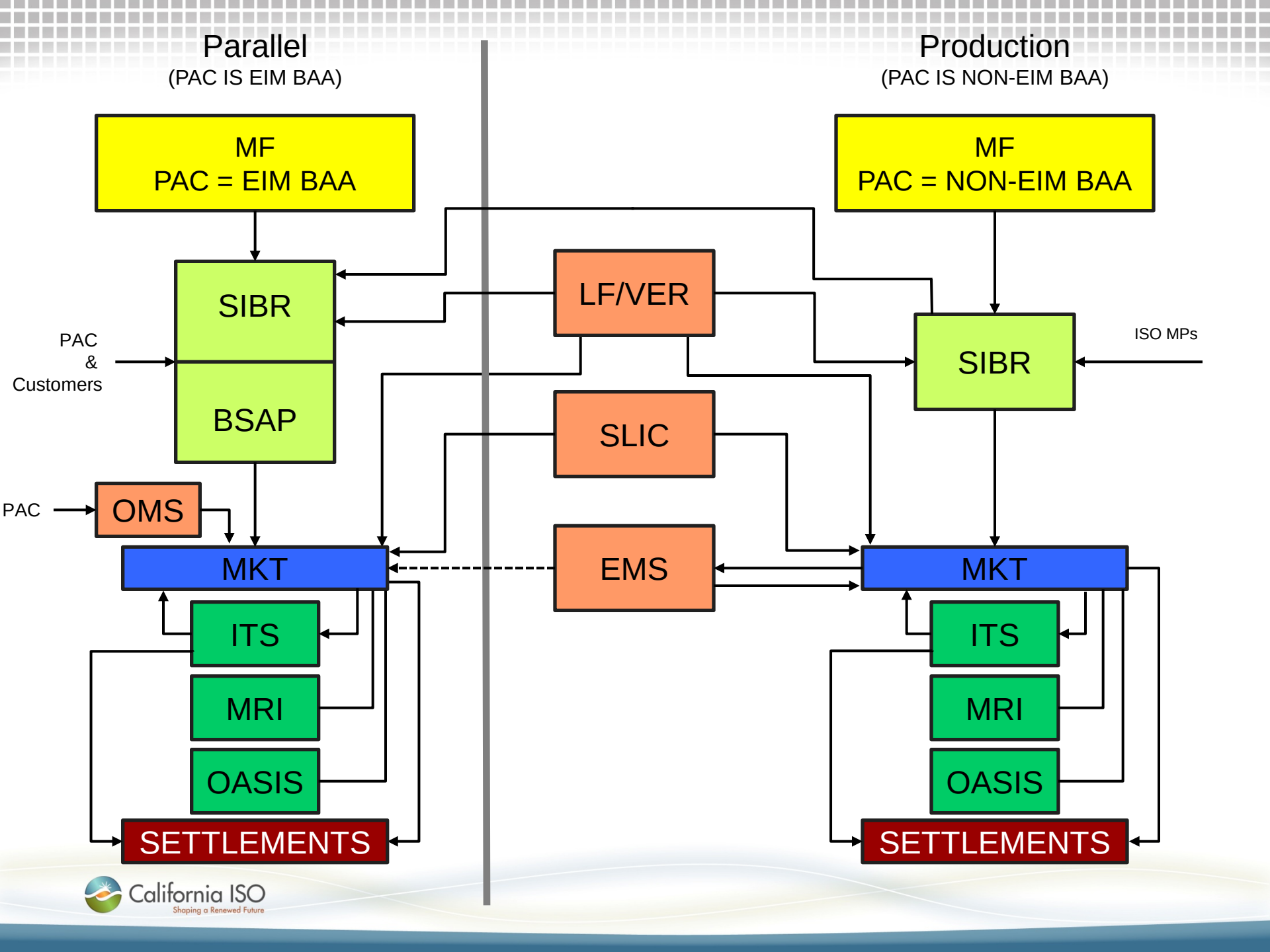
- Area-to-Area Net Schedule Interchange (AANSI)
  - Forecast AANSI is received before running market based on submitted e-tags in WIT and historical actual e-tag information
- Demand forecast per balancing area (PEAK RC)
- Calculate forecasted NSI per balancing area from the forecasted AANSI
- Generation per area = Demand forecast – NSI
- Distribute generation using GDFs to have external base nodal generation injections
- Distribute demand forecast using LDFs to have external base nodal withdrawals
- Run market with expanded FNM with external base nodal injections/withdrawals

EIM implementation has been ongoing in parallel with stakeholder and regulatory activities



EIM project implementation timeline




Parallel
(PAC IS EIM BAA)
Production
(PAC IS NON-EIM BAA)
MF
PAC = EIM BAA
MF
PAC = NON-EIM BAA
SIBR
BSAP
LF/VER
SLIC
EMS
SIBR
PAC
&
Customers
ISO MPs
PAC
OMS
MKT
MKT
ITS
MRI
OASIS
ITS
MRI
OASIS
SETTLEMENTS
SETTLEMENTS

EIM parallel production operation

- Eliminates some of the practical limitations of testing in a simulation environment
- PacifiCorp will be able to submit all input data and to receive non-binding dispatches and prices (all key interfaces provided)
- EIM will be accessible for BPA to test and monitor limits on selected internal BPA flowgates
- It would be possible to analyze different operation scenarios without affecting actual flows between BAs
- UI and other tools will be available for PacifiCorp and ISO operators
- Four EIM settlements will be calculated and posted for verification

Conclusion

- Implementation of FNM and EIM functions is completed
- Testing of FNM and EIM functionality are at the required level of completeness
- Market simulation scenarios and integration testing are completed
- There are no regulatory activities representing a barrier for FNM or EIM implementation
- ISO will be able to manage this additional work and at the same time maintain production environment
- Upon Board approval and successful passing of final readiness assessment on September 28 we will implement FNM and EIM on October 1