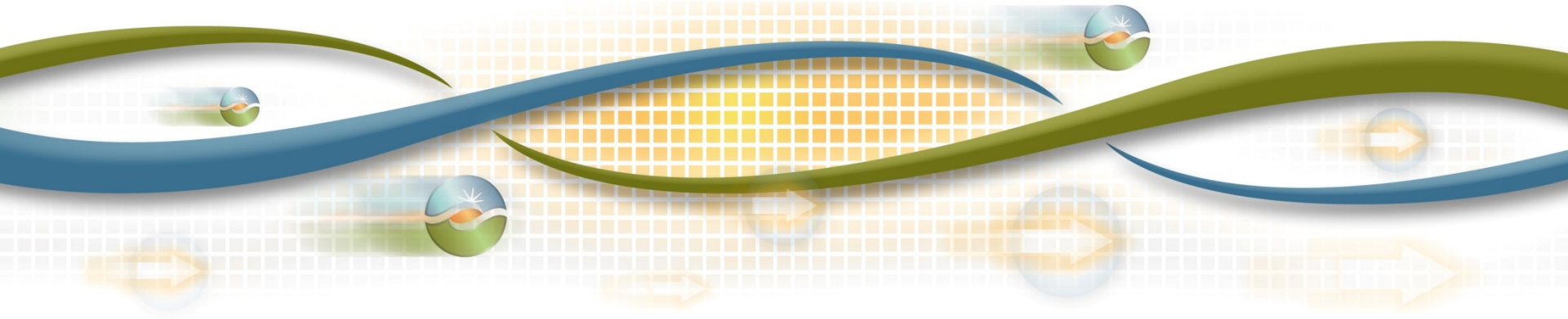


2018 Policy Initiatives Roadmap

Market and Infrastructure Policy
January 12, 2018



Agenda

Topic	Presenter
Introduction	James Bishara
Stakeholder comments	Brittany Dean
Three-year roadmap and 2018 Annual Plan	Market and Infrastructure Policy
Next Steps	James Bishara

STAKEHOLDER COMMENTS

Three-year roadmap and annual plan clarifications

Three-year roadmap

- CAISO strategic plan
- Long-term planning tool
- Initiatives dependencies, interrelationship, and implementation
- Consensus on priorities with stakeholders

Annual plan

- Initiatives and their approximate time frames

In response to ECE, First Solar, IPC, PacifiCorp, and Powerex comments

Strategic Vision



Three-Year Roadmap



Annual Plan

STRATEGY
1

LEAD THE TRANSITION TO
A LOW CARBON GRID

STRATEGY
2

RELIABLY MANAGE THE GRID
DURING ENERGY INDUSTRY
TRANSFORMATION

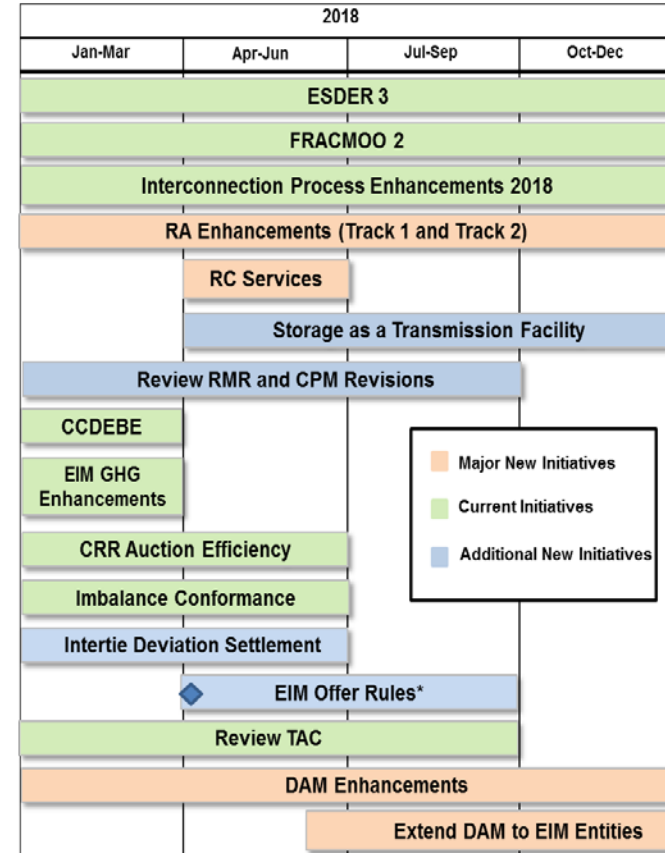
STRATEGY
3

EXPAND COLLABORATION
TO UNLOCK REGIONAL
BENEFITS

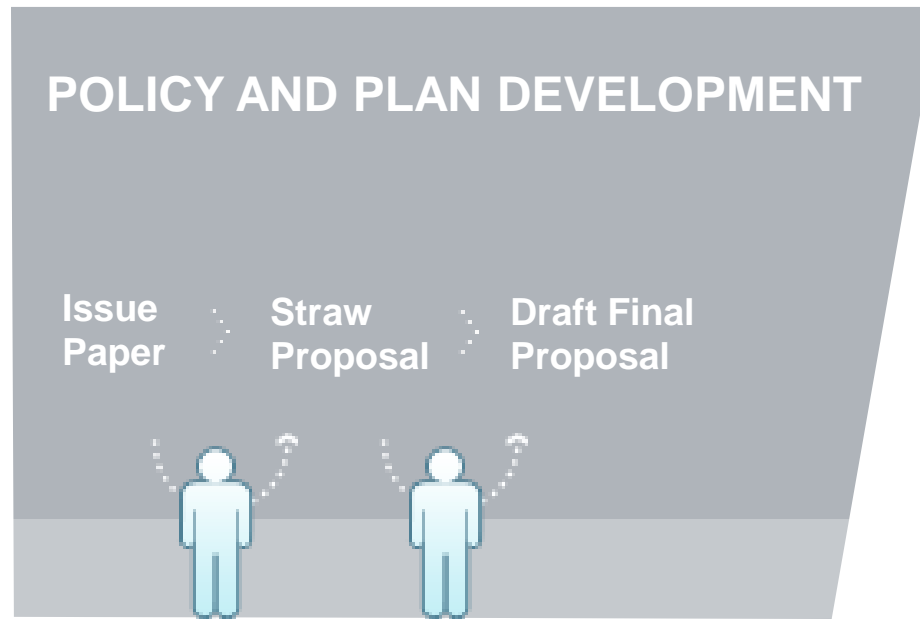
**Evolve ISO
Markets
(Strategy 1,2,3)**

**Enhance
Resource
Adequacy
(Strategy 1,2)**

**Shape Electric
Sector
Decentralization
(Strategy 1)**



CAISO policy initiative stakeholder process



Issue paper

- Discusses objectives, issues, scope, and timeline
- *If applicable, EIM Governing Body categorization*

In response to ECE, First Solar, Islands Energy Coalition LSA, Natural Resources Defense Council, Northwest Energy Coalition, PacifiCorp, PG&E, PGP, Powerex, Vote Solar, Western Grid Groups comments

Day-ahead Market Enhancements and Extend Day-Ahead Market to EIM Entities

- DAM enhancements objective is to ensure the day-ahead market is more representative of actual real-time ramping needs.
- EIM participants and other interested parties should actively participate in day-ahead market enhancements initiative
- At kickoff meeting for day-ahead market enhancements, the ISO will discuss with stakeholders additional design elements needed to extend to EIM entities

In response to Islands Energy Coalition, Natural Resources Defense Council, Northwest Energy Coalition, PacifiCorp, Vote Solar, and Western Grid Groups

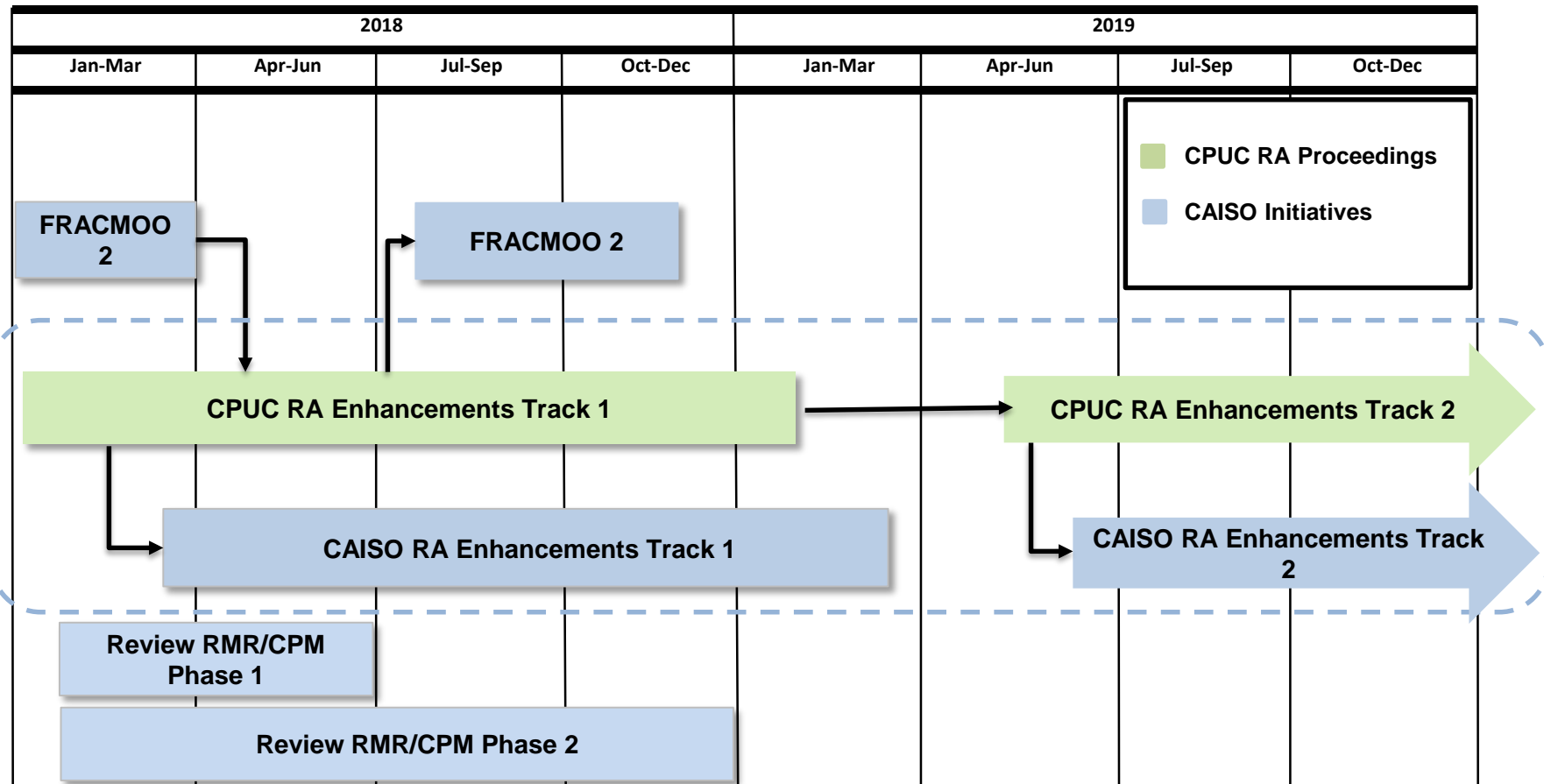
comments

Resource planning and procurement

- The roadmap establishes a plan for collaborating with the CEC and CPUC on planning, informing, and assessing forward procurement needs
 - CA statutes specify roles for CEC, CPUC, and CAISO
- The roadmap outlines a clear two track RA reform plan to align RA with the needs of the transforming grid
- Not re-opening the Temporary Shutdown of Resource Operations initiative as part of the 2018 annual plan
- CAISO will simultaneously launch both phase 1 and 2 of its Review CPM/RMR initiative

In response to CEERT, LSA, NRG, PG&E and WPTF comments

CAISO-CPUC Resource Adequacy Interactions



RA Enhancements Track 1

- 1) Establish LSE RA assessment methodology to meet operational needs
- 2) Modify counting rules
- 3) Vet appropriate load forecasting assumptions

Implementation Fall 2019 for 2020 RA

RA Enhancements Track 2

- 1) Multi-year RA procurement
- 2) LCA specific procurement
- 3) Modify RA showing timeline

Implementation Fall 2020 for 2021 RA

Shape electric sector decentralization

- ESDER is an on-going initiative, relying on stakeholders to help prioritize in-scope items that lower market participation barriers and costs
- Roadmap recognizes need for a “high-DER” regulatory framework
 - Planning and procurement of hybrid DER resources
 - DER qualifying capacity counting rules and techniques
 - Multi-use applications and eligible value streams
 - Roles, responsibilities, coordination at the T&D interface

In response to CEERT and PG&E comments

CAISO response to stakeholder requests for 2018 Annual Plan

- **EIM Default Energy Bid Option** (BPA, Chelan County, IPC, PacifiCorp, PGP, Powerex, and WPTF)
 - EIM Offer Rules initiative will examine Real-Time Resource Sufficiency and EIM DEB applicability to hydro in technical workshop
 - Identify issues to be addressed
- **Bid Floor** (LSA and WPTF)
 - Have not observed excessive instances of administrative pricing
 - CAISO will continue to monitor self-schedule curtailments

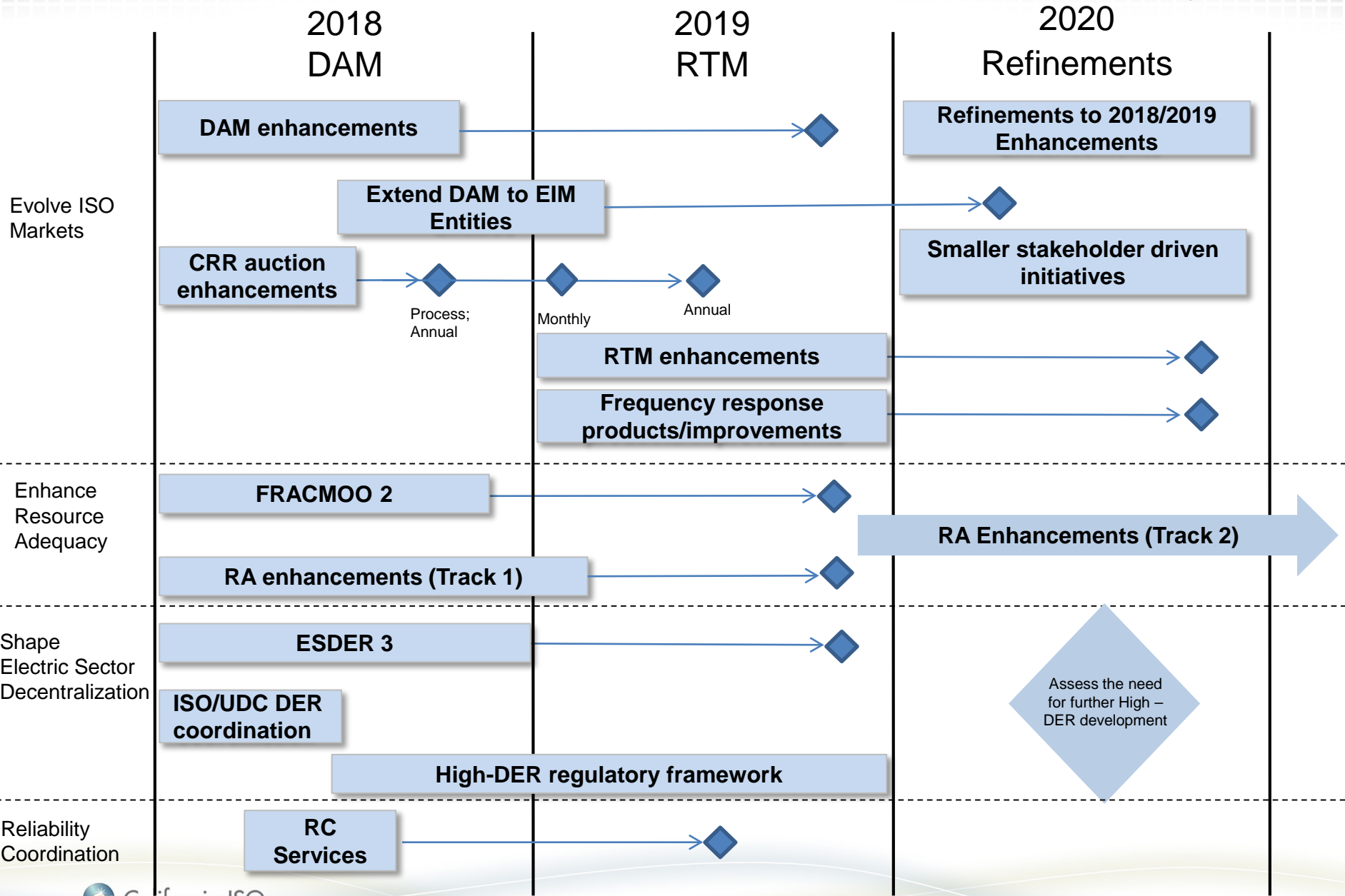
Requests addressed in planned initiatives

- **Over/Under Scheduling Load Enhancements** (NVEnergy)
 - Topic will be considered during Real-Time Resource Sufficiency initiative
- **Export Charges** (PacifiCorp)
 - Topic will be considered during Extend Day-Ahead Market to EIM Entities initiative
- **RMR/CPM** (PG&E)
 - Phase 1 & 2 to be run in parallel

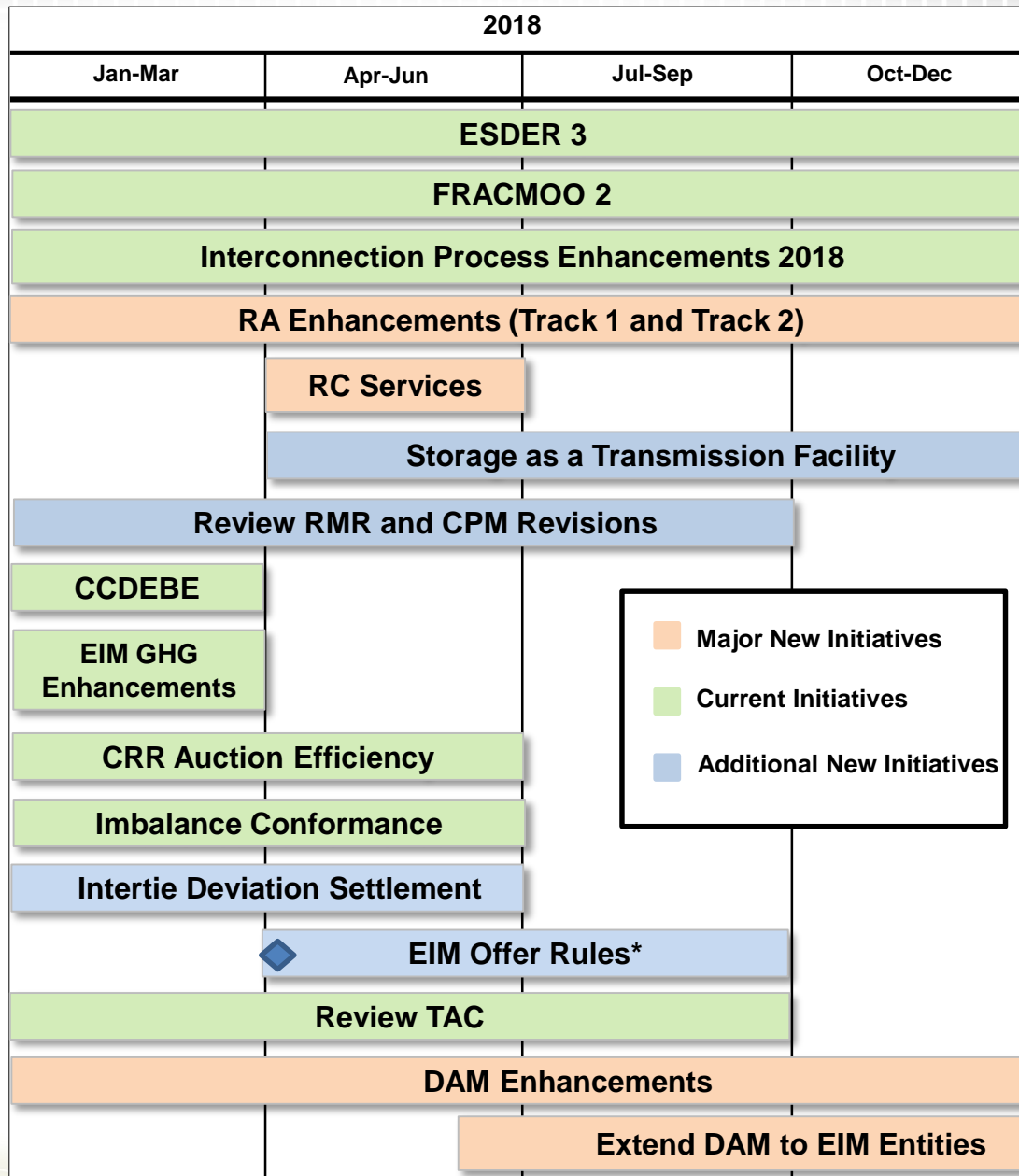
THREE-YEAR ROADMAP AND ANNUAL PLAN

Three-year Policy Roadmap of Major New Initiatives

◆ = Implementation



2018 Annual Plan



- Major New Initiatives
- Current Initiatives
- Additional New Initiatives

 Workshop

* EIM DEB
Option and
RT Resource
Sufficiency

2018 Policy Initiative Roadmap schedule:

Milestone	Date
Stakeholder call	January 17
EIM Governing Body briefing	January 23
Stakeholder comments	January 31
ISO Board of Governors briefing	February or March

APPENDIX

Primary drivers of proposed three-year roadmap

- Recent grid operations challenges pointing to need for day-ahead market enhancements to better manage net load curve in real time
- Extending day-ahead market enhancements to other EIM balancing areas provides regional benefits
- Increasing risk of retirement leading to increase in RMR driving need to reform the RA program
- Continuing efforts to lower barriers to DER market participation and addressing T-D interface coordination in line with DER growth

Day-ahead market enhancements address net load curve and uncertainty previously left to real-time market

- 15-minute scheduling granularity
 - Ensures day-ahead market commits resources with sufficient ramping capability
- Day-ahead flexible reserve product
 - Compensates resources for must-offer obligation in real-time market to address net load uncertainty
- Combined IFM and RUC
 - Increase efficiency by simultaneously clearing bid in demand and balancing area net load forecast
 - Allow RUC to decommit resources
- Full network model phase 2
 - Improved modeling of intertie transaction sources/sinks

Extending DAM to EIM Entities provides additional regional benefits

- Key benefits:
 - Allows EIM participants to take advantage of day-ahead market enhancements
 - Day-ahead unit commitment and scheduling across larger footprint improves market efficiency and more effectively integrates renewables
- Key principles:
 - Each balancing authority retains reliability responsibilities
 - States maintain control over integrated resource planning
 - Resource adequacy procurement decisions remain with local regulatory authority
 - Transmission planning and investment decisions remain with each balancing authority and local regulatory authority

Scope of stakeholder initiative to extend day-ahead market to EIM Entities

- **Aligning transmission access charge (TAC) paradigms**
 - Ensure EIM Entities recover transmission costs consistent with existing bilateral transmission framework
 - Consistent billing determinants across day-ahead market footprint for market efficiency
- **Congestion revenue rights over expanded footprint**
 - Congestion hedging similar to CAISO balancing area
 - Address long-term bilateral transactions within expanded day-ahead market footprint
- **Day-ahead resource sufficiency evaluation**
 - Ensure balancing areas not leaning on others for capacity, flexibility or transmission

Scope of stakeholder initiative to extend day-ahead market to EIM Entities (continued)

- Transferring bid range
 - Facilitate monthly/daily/hourly bilateral transactions across expanded day-ahead market footprint
 - Used to help meet resource sufficiency evaluation using resources outside a balancing area
- Day-ahead GHG attribution
 - Extend EIM real-time market approach to day-ahead

Re-prioritized initiatives to focus on day-ahead market changes

- Deferring real-time market enhancements
 - High risk to implementing day-ahead and real-time market changes at the same time
 - CAISO and stakeholder resource constraints
 - Considering limited technology enhancements to shorten real-time market timelines
- Deferring frequency response product development and pay-for-performance regulation
 - FERC frequency response requirements uncertain (NOPR outstanding)
 - CAISO continues to evaluate system needs
 - CAISO and stakeholder resource constraints

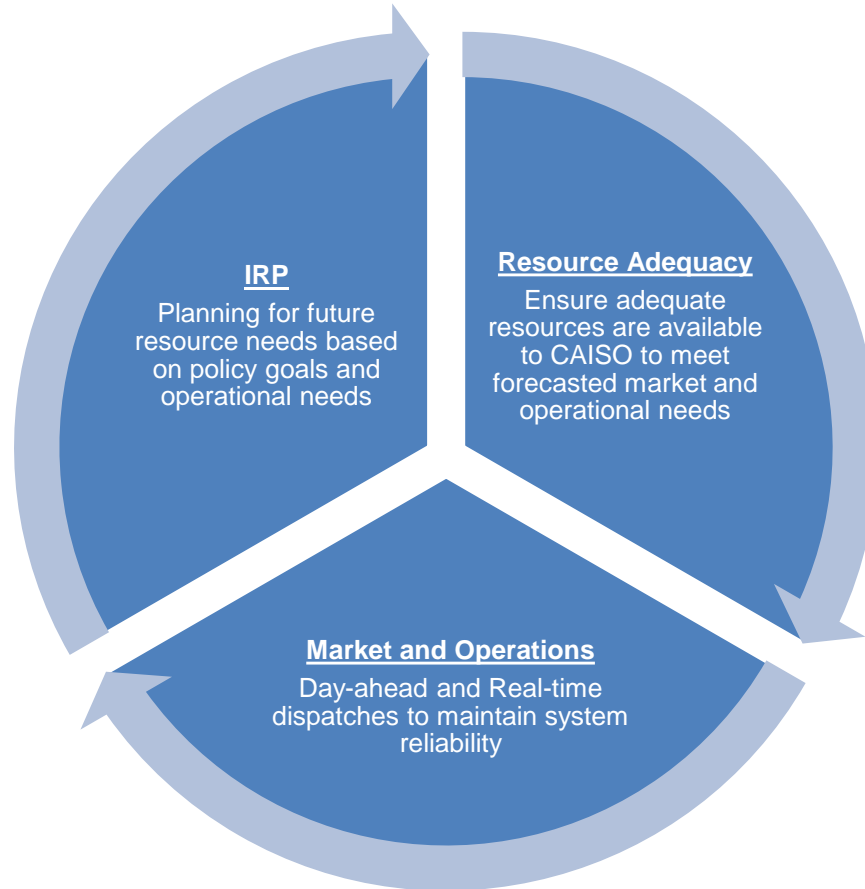
Examining CRR auction efficiency is a high priority

- Scope: address CRR auction efficiency while balancing solutions with the need for market participants to hedge congestion
- Phased approach:
 - Promptly start and complete stakeholder initiative to examine issue and develop solutions
 - Phase implementation of identified solutions:
 - Implement any process changes as soon as feasible
 - Make any monthly auction changes as soon as feasible
 - Make any annual auction changes for auction conducted in July 2019

Emerging trends altering the California resource procurement and resource adequacy landscape

- Existing focus on summer peak demand is failing to secure the right resources and capabilities as the grid transforms
- Load migration is causing utilities to alter long-term contracting practices and minimize stranded procurement risk
- State policies promoting procurement of renewable and distributed energy resources
- Some gas resources needed for reliability in need of significant maintenance and capital investment
- Lower energy market prices lead to revenue inadequacy and potential uneconomic retirements

Long and short-term planning must align with changing operational needs as generation fleet evolves to meet California energy policy goals



Collaborate with the CPUC to align resource adequacy with the needs of the transforming grid

RA Enhancements Track 1 (2020 RA)

- Establish RA capacity assessment that is better aligned with operational needs of the transforming grid
- Modify resource counting rules for non-availability and outages
- Vet load forecasting assumptions used to set RA requirements

RA Enhancements Track 2 (2021 RA)

- Establish multi-year RA requirements to ensure procurement of essential resources through transition to a low carbon grid
- Ensure sufficient capacity procured in each local capacity area
- Modify RA showing timeline to enable orderly retirement decisions

ESDER initiative will continue to refine DR and DER modeling and seek to lower integration barriers

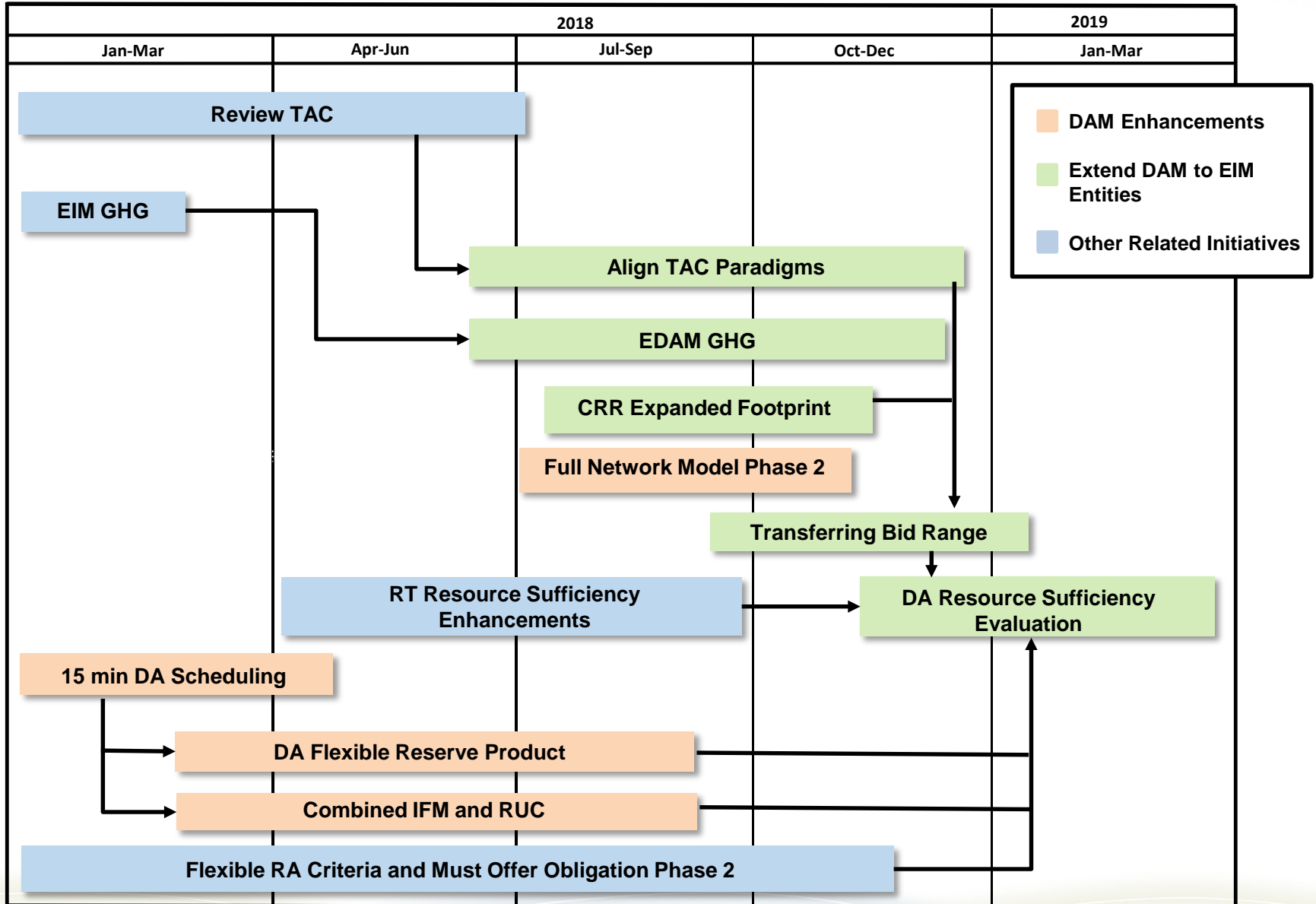
- Expand DR and DER modeling to optimally capture value and leverage resource design attributes that support the grid
- Focus on regulatory framework to address:
 - DER resource adequacy qualification rules
 - Qualifying capacity counting of DERs
 - Roles and responsibilities at transmission and distribution interface to coordinate and manage DERs
- Clearly define multi-use applications to ensure sensible service and value stacking that supports reliability and optimizes resource value

Review and revise CAISO backstop procurement options

Proposed two-phased RMR/CPM review:

- Phase 1: Consider more immediate changes to the long-standing Reliability Must Run contract, its terms and conditions
- Phase 2: Consider integration of RMR and CPM into a single, cohesive CAISO backstop procurement mechanism

Day-ahead market/Extended Day-ahead Market Interactions



Additional new initiatives on annual plan address important issues

- **Imbalance conformance**
 - General consensus among stakeholders to pursue solution proposed in ISO technical bulletin
- **Intertie deviation settlement**
 - Reliability concerns regarding recent quantities of undelivered imports/exports
- **Real-time resource sufficiency evaluation**
 - General consensus among stakeholders that improvements are needed

Additional new initiatives on annual plan address important issues (continued)

- **Storage as a transmission facility**
 - FERC January 2017 policy statement on ability for storage resources to provide services through cost and market based rates
 - Need to consider roles, responsibilities, costs, and operation of storage as a transmission facility under the CAISO tariff
- **Interconnection process enhancements 2018**
 - Modifications and clarifications to the current process