2021 Three-Year Policy Initiatives Roadmap and Annual Plan

Market and Infrastructure Policy

September 30, 2020

Roadmap Process

- This roadmap is published annually and describes the policy initiatives the ISO will undertake the following 3 years and their approximate timeframes
- The development of the annual roadmap includes updating the Policy Initiatives Catalog
  - Comprehensive directory of current, planned, and potential policy initiatives that require a stakeholder process
  - Stakeholders can propose potential policy initiatives
  - Updated twice a year but catalog submissions are accepted year-round

PRIMARY DRIVERS

Primary drivers of proposed three-year roadmap

- Meet operational needs resulting from the changing resource fleet
  - Integrate new technologies to replace operational attributes previously provided by the thermal fleet
  - Enhance market products, modeling, and deliverability
- Enhance the day-ahead market and extend to EIM entities to leverage regional diversity to provide benefits across the West
- Align resource adequacy requirements and rules with changing operational needs and tightening western supply conditions

EVOLVE ISO MARKETS

The day-ahead market enhancements initiative addresses challenges of the transforming grid

- Efficiently schedule supply to meet net load and to address uncertainty that may materialize between day-ahead and real-time
  - Improve market efficiency and price signals by co-optimizing new capacity products with energy and ancillary services
- Minimize the need for out-of-market actions to meet operational needs

Extending the day-ahead market to EIM entities provides regional benefits

- EDAM will improve market efficiency and more effectively integrate renewable resources by
  - Optimizing day-ahead unit commitment
  - Producing hourly schedules
  - Improving transmission utilization across a larger footprint

Stage EDAM policy development to develop policy on major topics prior to considering other issues

- Bundle 1 – Resource sufficiency evaluation, transmission provision, transfer/congestion revenue
- Bundle 2 – Accounting for GHG costs, ancillary services, FNM Phase 2, EDAM administrative fee
- Bundle 3 – Price formation, convergence bidding, external resource participation, market power mitigation including system market power, other issues

Upcoming dispatch enhancements initiative will improve renewable resource management

- Manage ramp rates to better control system balance
- Enhance market incentives for resources to provide accurate curtailment response
- Explore solutions to mitigate decremental market power
- Change settlement rules for decremental exceptional dispatch

New scarcity pricing initiative planned in response to Summer 2020 tight supply conditions

- This initiative will explore enhancements to market's scarcity pricing provisions
  - Explore enhancements to energy and flexible ramping product pricing when there are potential or actual shortages
  - Explore enhancements to existing ancillary service scarcity pricing provisions

- This initiative will also examine relationship of scarcity pricing to System Market Power Mitigation and FERC Order 831 designs

ENHANCE RESOURCE ADEQUACY

The RA program must be reformed to ensure operational needs are met all hours from a reliable resource portfolio

- RA framework must reflect the evolving needs of the grid and accurately evaluate and value resources that can meet all operational needs- peak, net peak, energy, operating reserves, and flexible ramping capability
- RA counting rules should promote procurement of the most dependable, reliable, and effective resources and must consider resource use- and availability-limitations and historic forced outage rates
- A portfolio assessment must be performed to ensure the shown RA fleet is adequate to serve load under various load and net load conditions during all hours of the year
- CAISO and CPUC must collaborate to ensure effective procurement of capacity to reliably operate the grid

Proposed reforms will drive greater dependability and operability of the RA fleet

- UCAP- RA resources' capacity values properly reflect their availability and that they maintain a high-degree of availability
- RA imports- RA import rules eliminate the possibility of double counting and speculative supply
- Portfolio assessment- ensure the shown RA fleet satisfies all operational needs in all hours
- Must offer obligations- minimize exemptions and ensure resources are offered into the market to meet their RA obligations
- Flexible RA- ensure sufficient resources are secured to meet ramping and uncertainty needs to ensure reliable operations given growing supply and demand variability
- Operationalizing storage- ensure sufficient stored energy is available at the right time and place to meet operational needs

Enhancements to resource adequacy program needed to align procurement with operational needs

- Phase 1 - Implementation 2021
  - RA Import provisions
  - Planned outage process enhancements
  - Local studies w/ availability-limited resources CPM clarifications
  - Operationalizing Storage – minimum charge requirement
- Phase 2 - Implementation 2022
  - Unforced capacity (UCAP) counting
  - Portfolio analysis to ensure system sufficiency
  - Day-ahead market enhancements alignment
    - Must offer obligations and Bid Insertion Modifications
    - Flexible Resource Adequacy

INTEGRATING DISTRIBUTED ENERGY AND STORAGE RESOURCES

ESDER implementation, evaluation, and clean up

- Focus on implementing ESDER 3b and ESDER 4 functionality in 2021 and 2022
  - Evaluate the usefulness and effectiveness of new distributed energy resource functionality and identify gaps that remain
  - Will consider new enhancements based on evaluation of current functionality
- Focus on operationalizing distributed energy resources
  - Enhancements to distributed energy resource systems and tools
  - Greater visibility
  - Enhanced forecasting
  - Operationalizing storage

Ensure most effective use, value, and treatment of distributed energy and storage resources

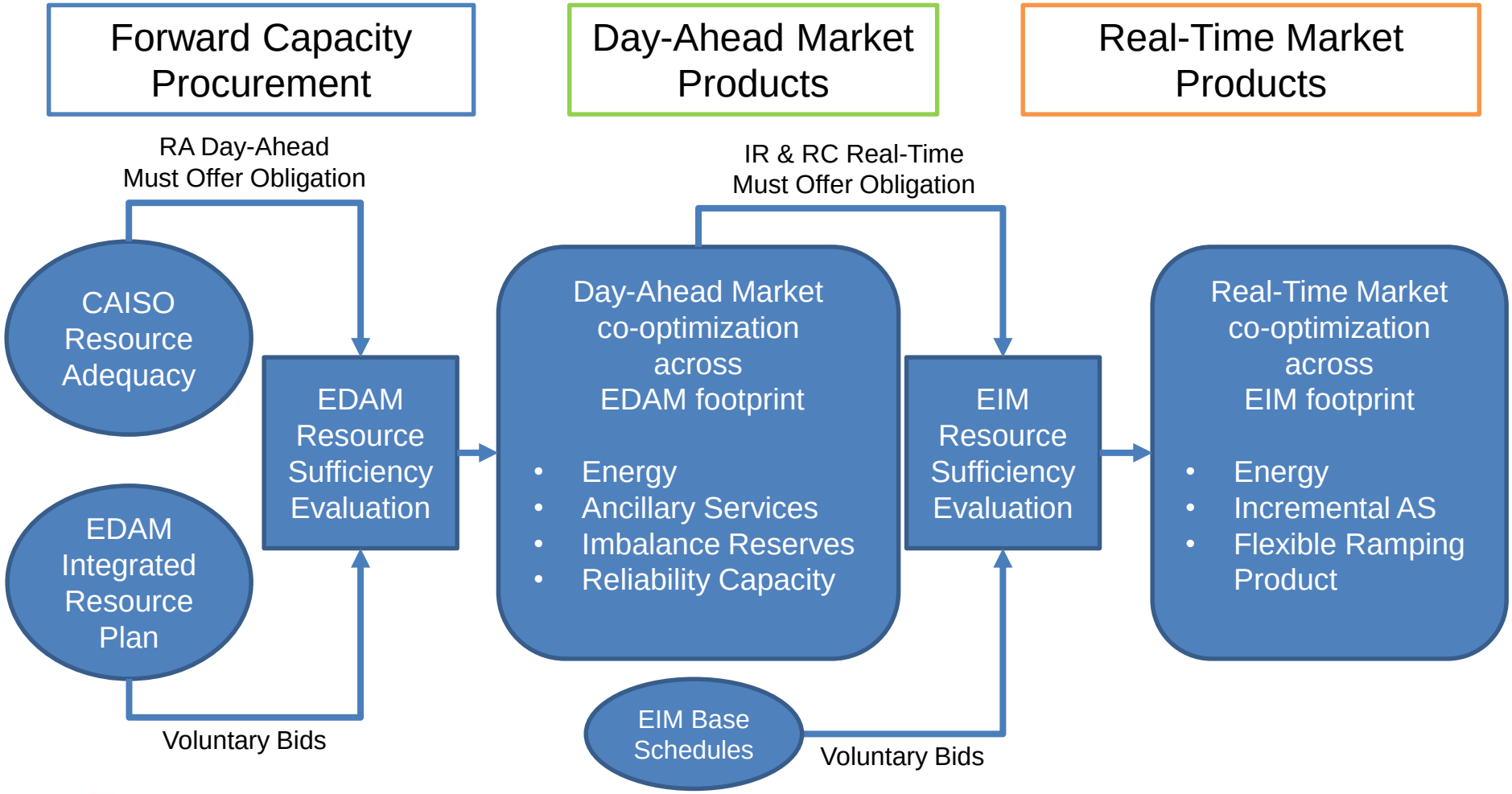
- Allow time for local regulatory authorities to develop policies needed to integrate distributed energy resources into the market
- Within California, coordinate with CPUC and CEC on demand response valuation, load management standards, resource adequacy rules, and load modification rules
- Refine applicable business practice manual and tariff provisions
  - Must offer obligations
  - Resource adequacy rules
  - Default energy bids

Hybrid resource evolution initiative will develop additional provisions and consider enhancements for hybrid resource market participation

- Market power mitigation
- Resource adequacy must offer obligations
- Additional functionality based on operational experience

ROADMAP AND ANNUAL PLAN

Market evolution requires coordinated policy development among forward capacity requirements, day-ahead market enhancements, and extended day-ahead market

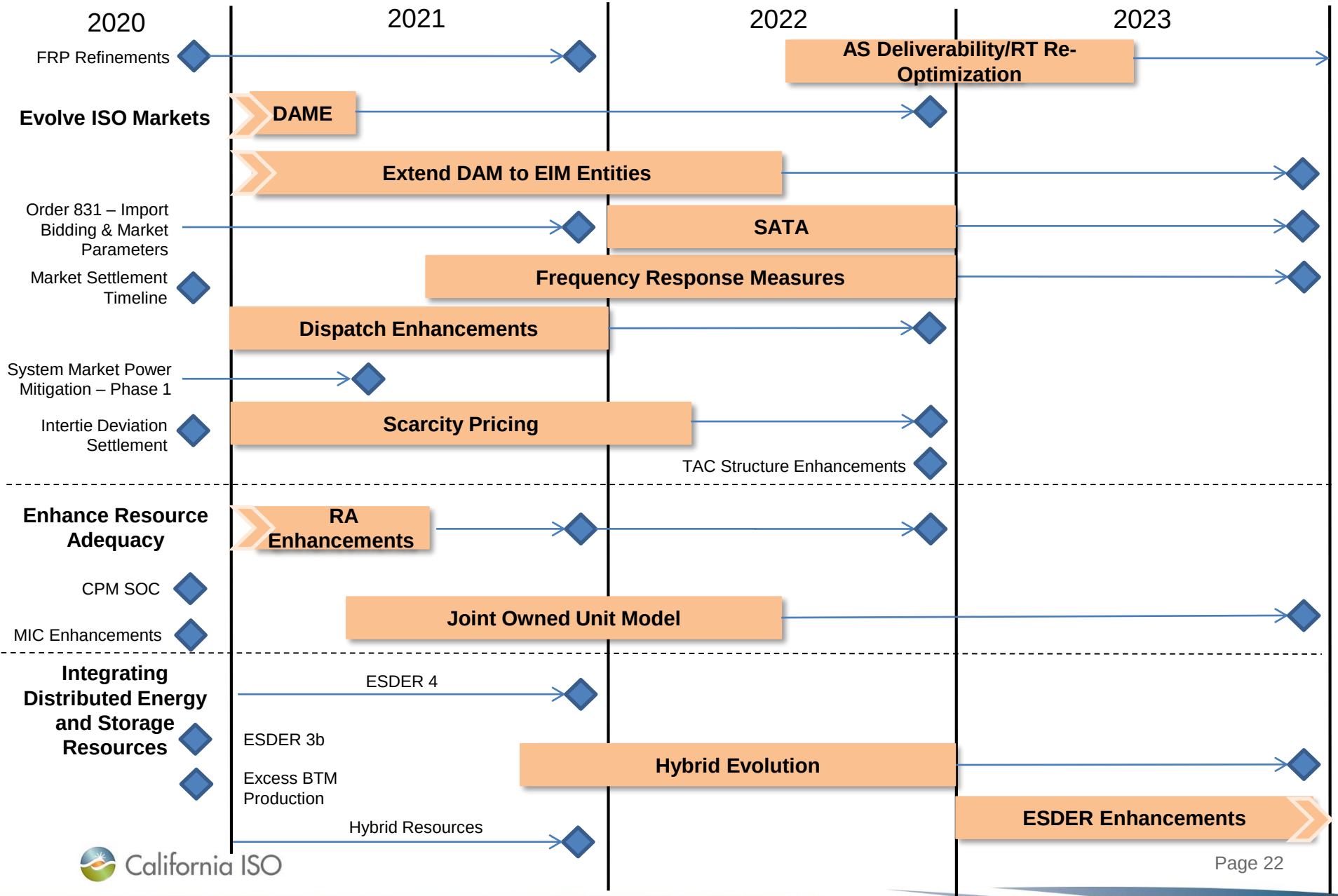


CAISO did not include a few initiatives from the previous roadmap

- System Market Power Mitigation
  - Second phase will be conducted in conjunction with EDAM design
- Congestion Revenue Rights Track 2
  - Major modifications not immediately needed but further refinements will be considered
- Commitment Costs and Default Energy Bid Enhancements Phase 2
  - Want to see how Phase 1 performs and confirm consistency with EDAM or DAME
- Contingency Modeling Enhancements
  - Changing NERC standards decrease benefit of implementation

Proposed Three-year Policy Roadmap of Major Initiatives

◆ = Implementation



*Timeframes are approximate and subject to change

2021 Draft Annual Plan

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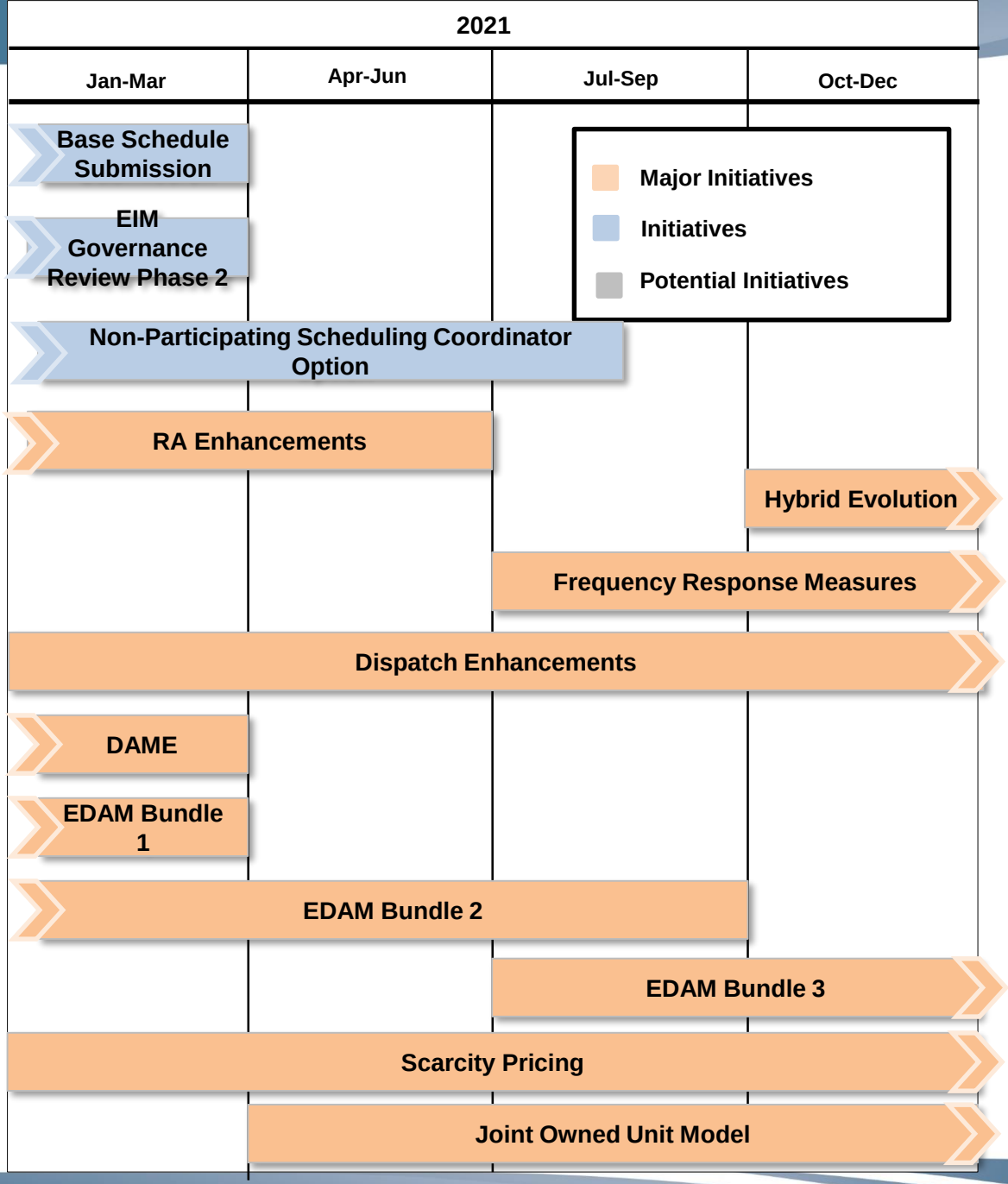

2021 Policy Initiatives Roadmap process schedule

- Draft 2021 roadmap and annual plan – Sep 30
  - Stakeholder Call – October 7th
  - Comments due – October 21st (initiativecomments@caiso.com)
- Final roadmap and annual plan – early Nov
  - Stakeholder call – mid Nov
  - Comments due – late Nov (initiativecomments@caiso.com)
- EIM Governing Body briefing – early Dec
- CAISO Board of Governors briefing – mid Dec