California ISO
Shaping a Renewed Future

Reliability Services
Market Mechanism Working Group

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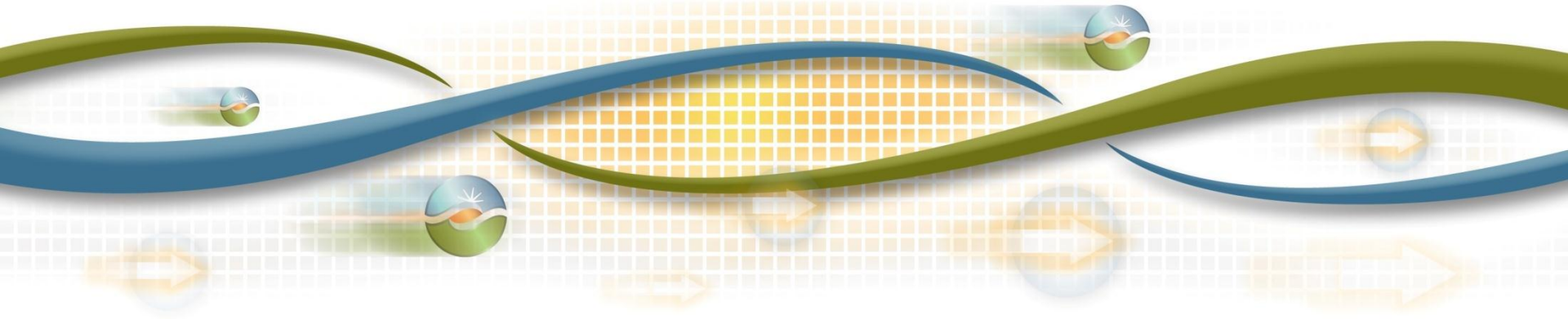


March 27th detail agenda

Est. Time	Workshop Agenda Topic
10:00 – 10:15	Overview and scope
10:15 – 10:45	Objective and design principles
10:45 – 12:00	Residual procurement market mechanism options
12:00 – 1:00	Lunch
1:00 – 2:00	Residual procurement market mechanism options
2:00 – 3:45	Reliability Services Auction design proposal
3:45 – 4:00	Wrap up, schedule, comments

RSI schedule

Date	Event
January 28, 2014	Issue Paper Posted
February 24, 2014	Working group on market mechanism
March 27, 2014	Working group on market mechanism
June, 2014	Straw proposal posted
August, 2014	1st revised straw proposal posted
October, 2014	2nd revised straw proposal posted
December, 2014	Draft final proposal posted
Jan/Feb 2015	Board of Governors meeting
April 1, 2015	FERC filing
Q1, 2015 – Q3, 2015	Implementation period
October, 2015	Annual RA compliance for 2016
February 16, 2016	CPM expiration

Reliability Services scope phase 1

- Create Reliability Services Auction to enable voluntary forward procurement of capacity and replace CPM price
- Standardize eligibility criteria and must-offer requirements for local, flexible, and system RA resources as needed
- Enhance incentive mechanisms for RA resource market participation

Reliability Services scope phase 2

- Update the CPM to include multi-year backstop procurement authority
- Expand Reliability Services Auction to enable voluntary multi-year forward procurement and backstop price
- Revaluate need for risk-of-retirement backstop procurement authority

February 24th, 2014 working group

- Reviewed residual procurement today and expectations for it in the future
- Multiple stakeholders as well as the ISO presented on potential options for a residual market mechanism

- Presentations from working group posted on website
- ISO responses to comments on issue paper and working group are posted as well

Stakeholder comment themes

- Timing with CPUC processes
- Residual auction
  - Voluntary auction and CPM replacement connection
  - Connection with multi-year
- Filing at FERC to extend the current CPM settlement
- Energy market and capacity market roles in ensuring ISO has required operational flexibility
- Auction liquidity concerns
- Market design details
  - Bidding rules
  - Market power

OBJECTIVE AND DESIGN PRINCIPLES

Objective

- Create forward voluntary auction for residual capacity needs
- Replace CPM price with market-based price
- Market-based price should efficiently value capacity capabilities:
  - Help ensure the ISO system has sufficient capacity in the mid-term
  - Minimize risk of disorderly retirement
  - Increase participation from preferred resources

Joint Reliability Plan

- “In addition to providing a backstop procurement mechanism to replace the CPM, the ISO will consider allowing LSEs to utilize the auction to clear voluntary bids to buy, and for resources to sell, forward capacity in excess of any forward capacity procurement requirements” (page 6, JRP)
- JRP envisioned a functioning auction for backstop capacity that would also allow for forward procurement above the requirement

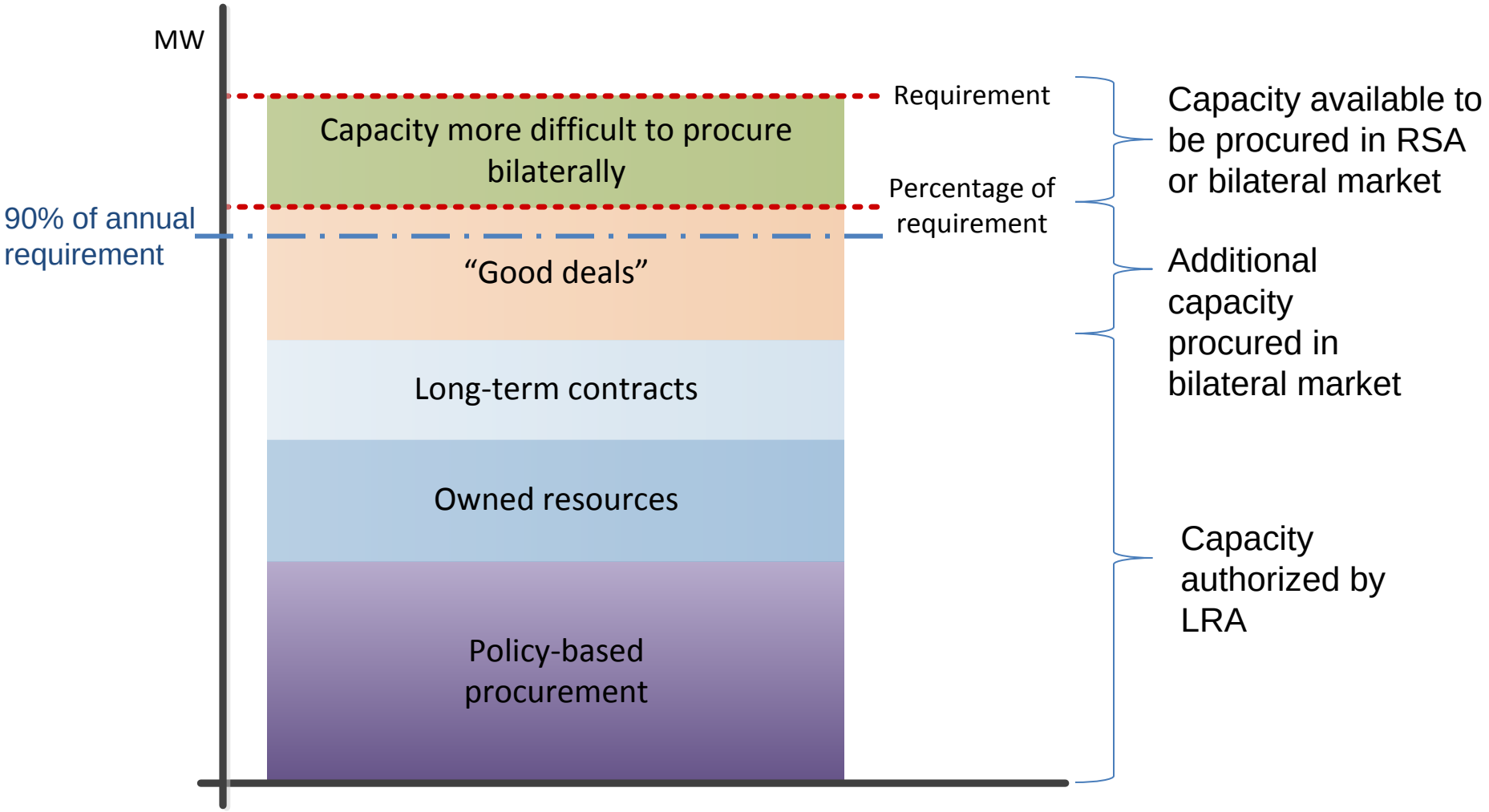
Forward voluntary auction

- Although the vision of the JRP was to have a *single* auction clear voluntary forward capacity above RA requirements and concurrently backstop capacity below RA requirement, this may not be the optimal solution to achieve objectives in JRP
- Forward voluntary auction can be combined or separate from backstop mechanism
- The ISO sees significantly more liquidity in an annual voluntary forward mechanism than in an annual backstop mechanism

Uses for a market rather than bilateral procurement

- Unexpected capacity needs due to load changes or known future outages
- Remaining capacity requirements or excess after putting together an efficient portfolio
- Difficult to contract for capacity due to specific attribute being needed
  - Flexible categories (currently 3)
  - Other products (potential future)

Market and bilateral procurement division



Growing primary and residual procurement complexity

- Flexible requirement
  - Today, categories
  - In the future, potentially multiple flexibility types
- Replacement rule
  - Multiple procurement timeframes
- Other fundamental resource changes in RA
  - Increase in renewable resources
  - Increase in preferred resources
  - Increase in use-limited resources

Capacity Procurement Mechanism

CPM backstop events

1. Insufficient local or system capacity in annual resource plan
2. Insufficient local or system capacity in monthly resource plan
    a) Replacement requirement deficiency
3. Collective deficiency in Local area
4. Significant event
5. Exceptional dispatch
6. Risk of retirement
7. Insufficient flexible in annual or monthly resource plan
8. Multi-year insufficiencies

CPM by time period

1. Annual CPM
   - Insufficient local or RA in annual resource plan
   - Collective deficiency in Local area
2. Monthly CPM
   - Insufficient local or RA in monthly resource plan
   - Collective deficiency in Local area
   - Replacement requirement deficiency
3. Unsystematic CPM
   - Significant event
   - Exceptional Dispatch
   - Risk of retirement

CPM process today

- The ISO determines whether to issue a CPM for backstop capacity based on criteria in tariff section 43
- In the annual and monthly process, the LSE is given an opportunity to cure its shortage bilaterally before the ISO issues a CPM
- Deficiencies that remain after the cure period (or for which there is no cure period) that cause the ISO to issue a CPM designation will be paid at the administrative CPM price
- A CPM designation is paid at the settlement price of $70.88 kW/year

CPM process in 2016

- The ISO determines whether to issue a CPM for backstop capacity based on criteria in tariff section 43
- In the annual and monthly process, the LSE is given an opportunity to cure its shortage bilaterally before the ISO issues a CPM
- Deficiencies that remain after the cure period (or for which there is no cure period) that cause the ISO to issue a CPM designation will be paid at the new market-based CPM price
- CPM price paid based on a mandatory backstop auction or derived from voluntary auction

CPM price replacement

- CPM procurement does not have to be done through a market-mechanism
- The CPM price should be based on a competitive market with a transparent clearing price that reflects market conditions
- The CPM price can be derived in conjunction with:
  - the forward voluntary auction, or
  - a mandatory backstop auction

DESIGN PRINCIPLES

Reliability services auction design principles

- Adaptable structure
- Simple framework as possible given the underlying complexity of RA procurement
- Efficiency
- Transparency

Mechanism principle: adaptable structure

- Develop a process that will allow for, but not necessitate more complicated procurement requirements
- This is what will create durability
  - Will help facilitate efficient short-term investment decisions
  - Incent orderly retirement

Mechanism principle: simplification

- Overly complex, prescriptive market designs add transaction costs to the ISO and market participants
- There is the risk that an overly complex RA framework could jeopardize the reliable operation of the grid
- A complex process limits transparency and mutes any issues with the efficiency of the overall market

Mechanism principle: efficiency

- An efficient residual procurement mechanism will optimize procurement
  - This is particularly important with flexible requirements
- Optimized procurement will pick the least-cost resource mix that meets the requirement

Mechanism principle: transparent process

- A transparent process will encourage efficient procurement through a mix of the bilateral and residual markets
  - The bilateral market will efficiently procure resources prior to the residual market
  - Anything that is more efficient to procure through an optimization may be procured through the residual market

Mechanism principle: transparent price

- A transparent price encourages efficient investment in resource capabilities and orderly retirement
- Maintain and increase flexible capability of RA fleet
  - A transparent flexible *capacity* price should incent orderly retirement and investment to maintain flexible capability of resources in the short-term
  - A transparent flexible *energy* price should incent (1) participation in the energy market and (2) short-term investments to increase flexible capabilities of already flexible resources

RESIDUAL PROCUREMENT MARKET MECHANISM OPTIONS

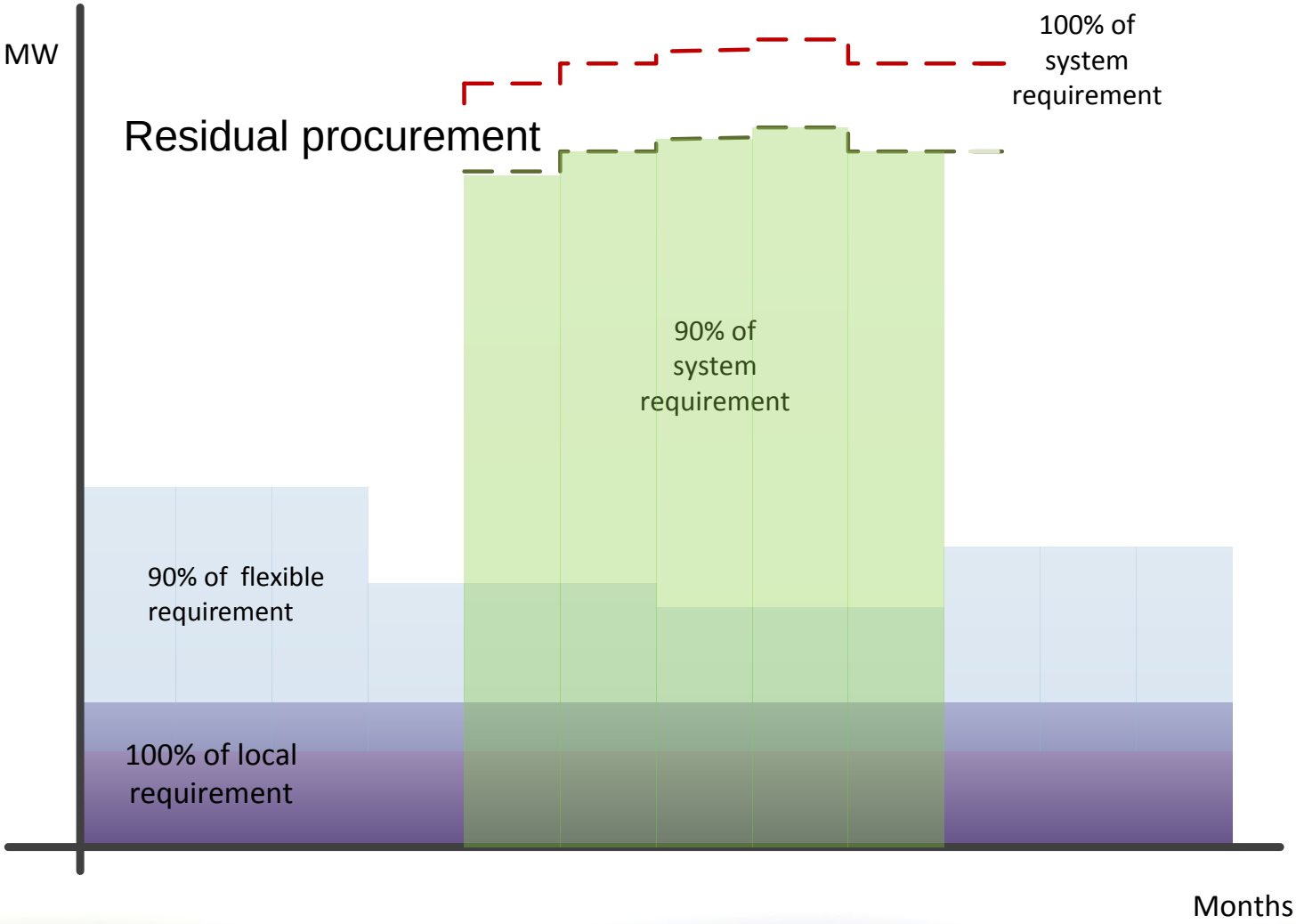
CPM extension

- Suggested by multiple parties
- Will remain an option that we could use in the future if we need additional time to finish a market design that is sufficiently advanced
- If ISO files for an extension it would be for a short transition period
- February 16, 2016 is still only slightly less than 2 years away, so it would be premature to file now from the standpoint of the ISO and presumably the FERC

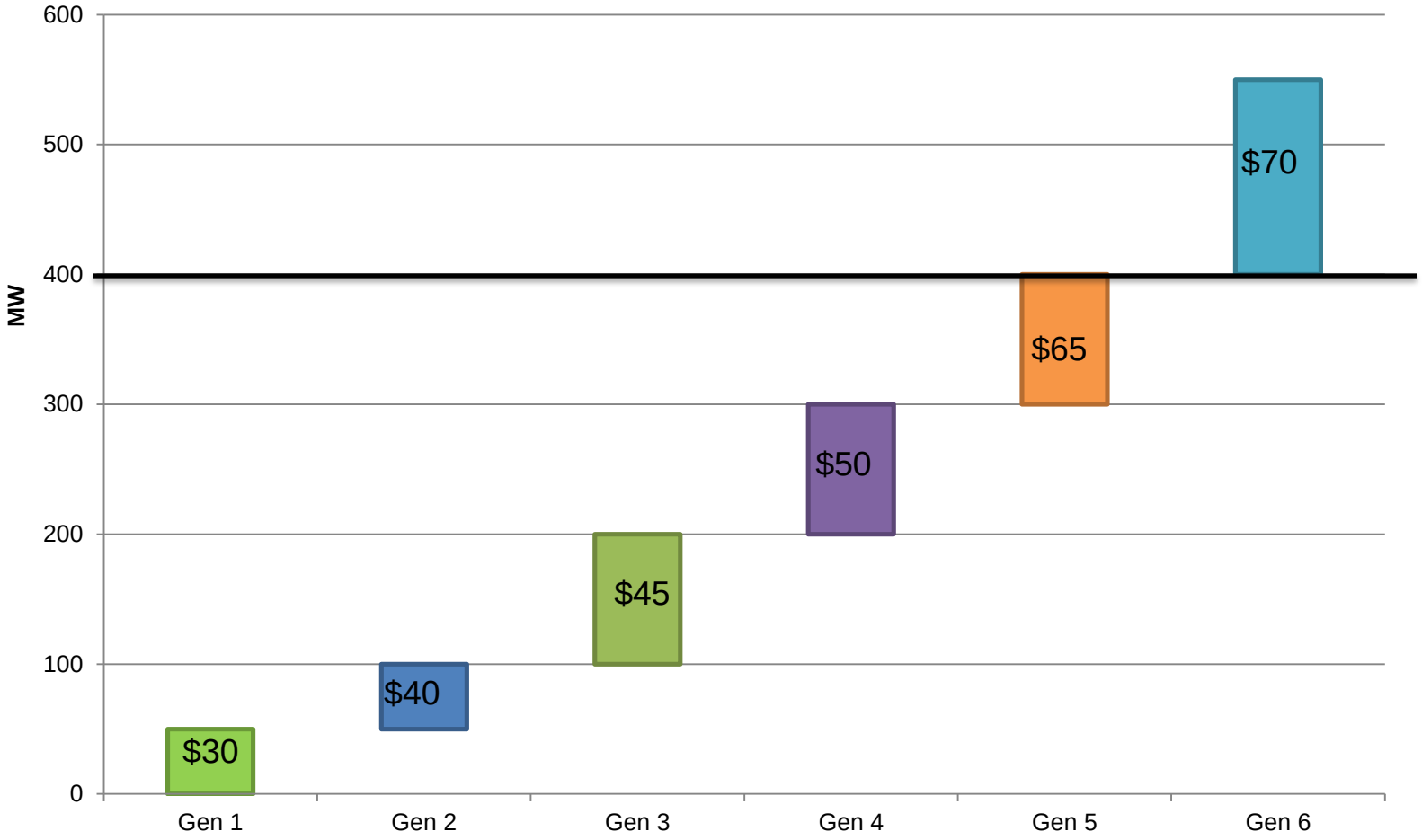
What is residual procurement?

- Residual procurement is any procurement that happens after primary procurement
- The ISO backstops and CPUC mandates 90% of LSE's system and flexible requirements must be procured prior to the annual showing date, which is the last business day in October
- Eventually, LSEs will have to procure 100% of monthly showing requirement
- The difference between the annual 90% requirement and eventual 100% monthly requirement is what the ISO is considering residual procurement

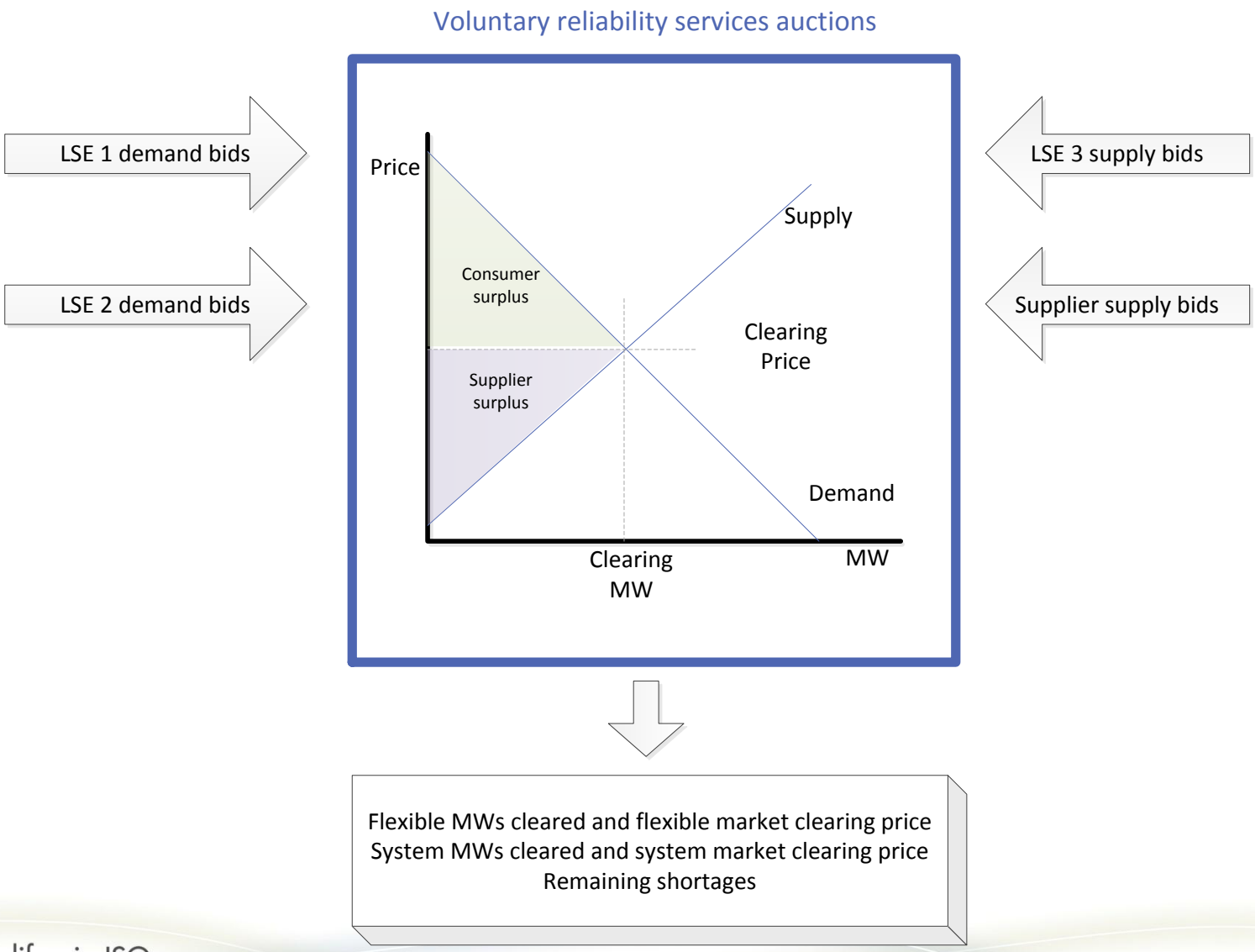
System residual procurement



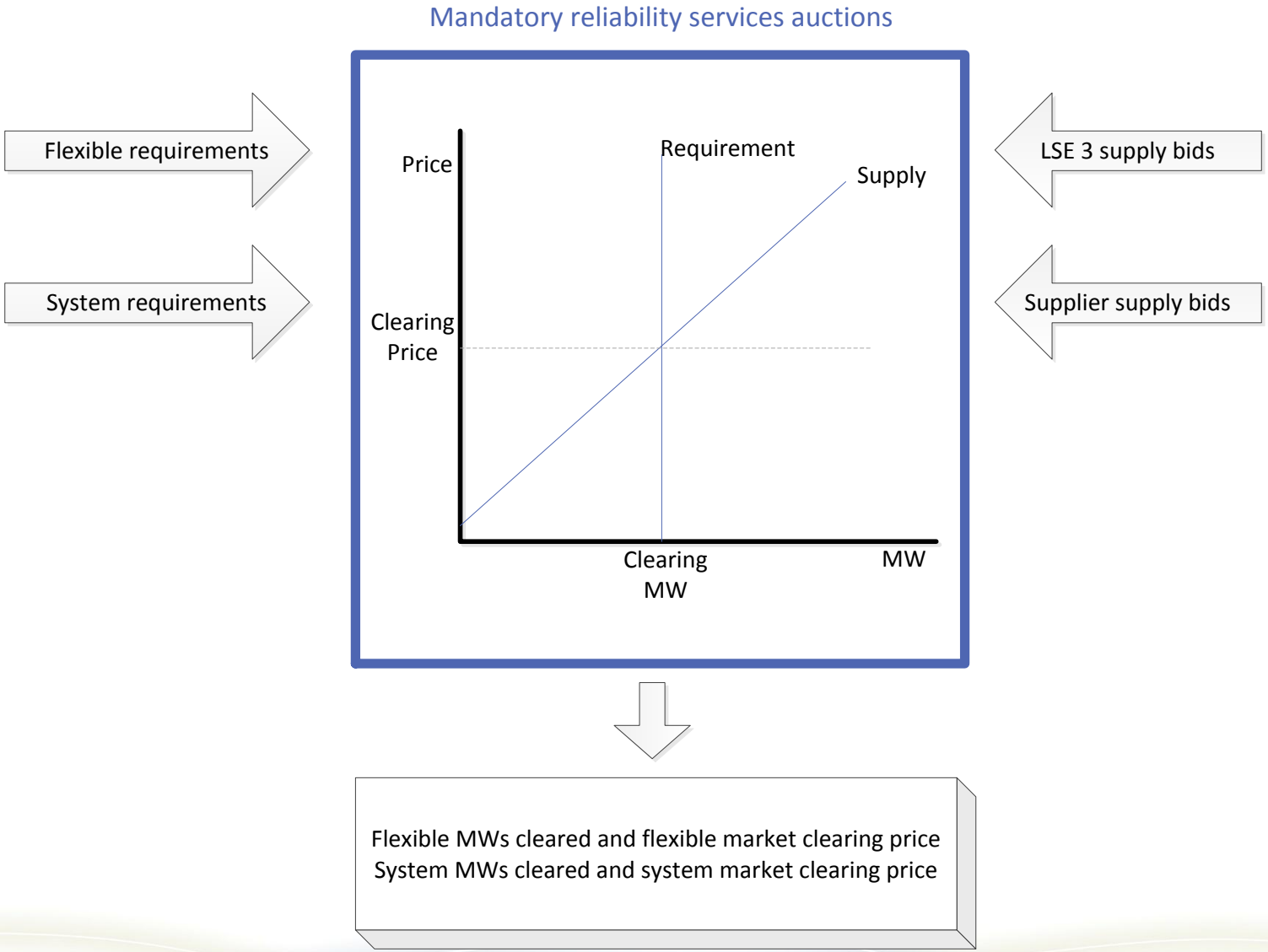
What is a competitive market auction for capacity?



What is a voluntary auction?



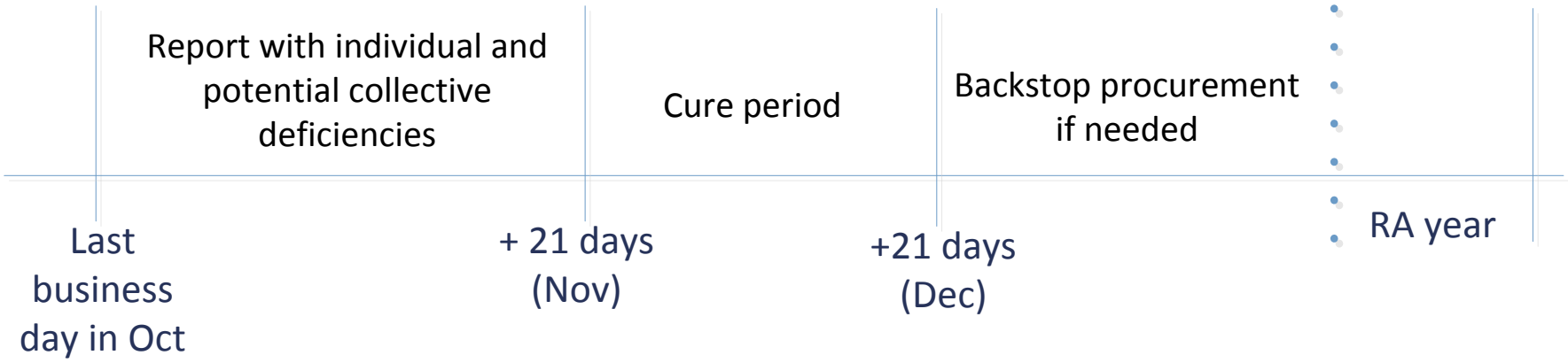
What is a mandatory backstop auction?



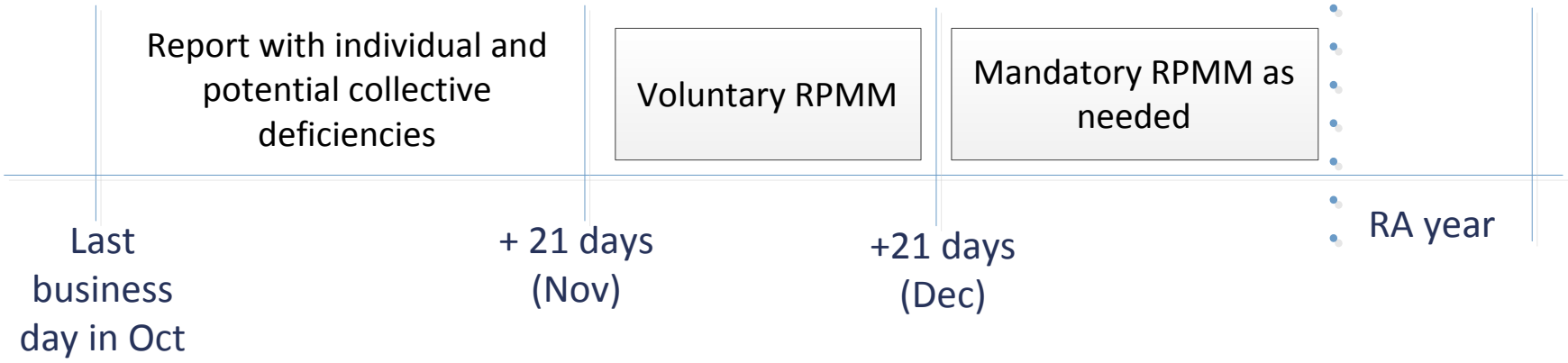
Conceptual auction options

- Split auction: a voluntary auction run followed by a mandatory backstop auction run
- Voluntary auction only: a voluntary auction that is used to create a CPM price
- Combined auction: a combined auction that has a mandatory portion and a voluntary portion
  - Example in appendix

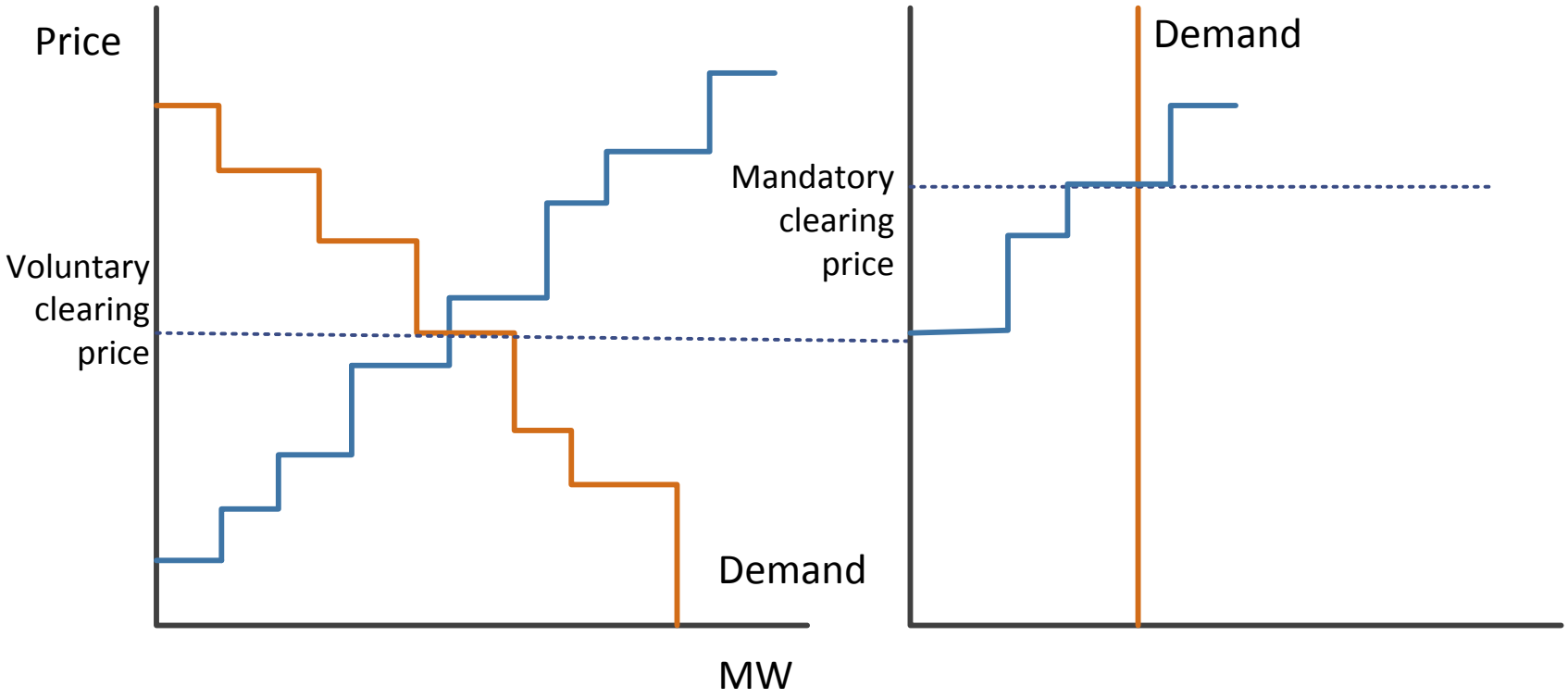
Current annual residual procurement process



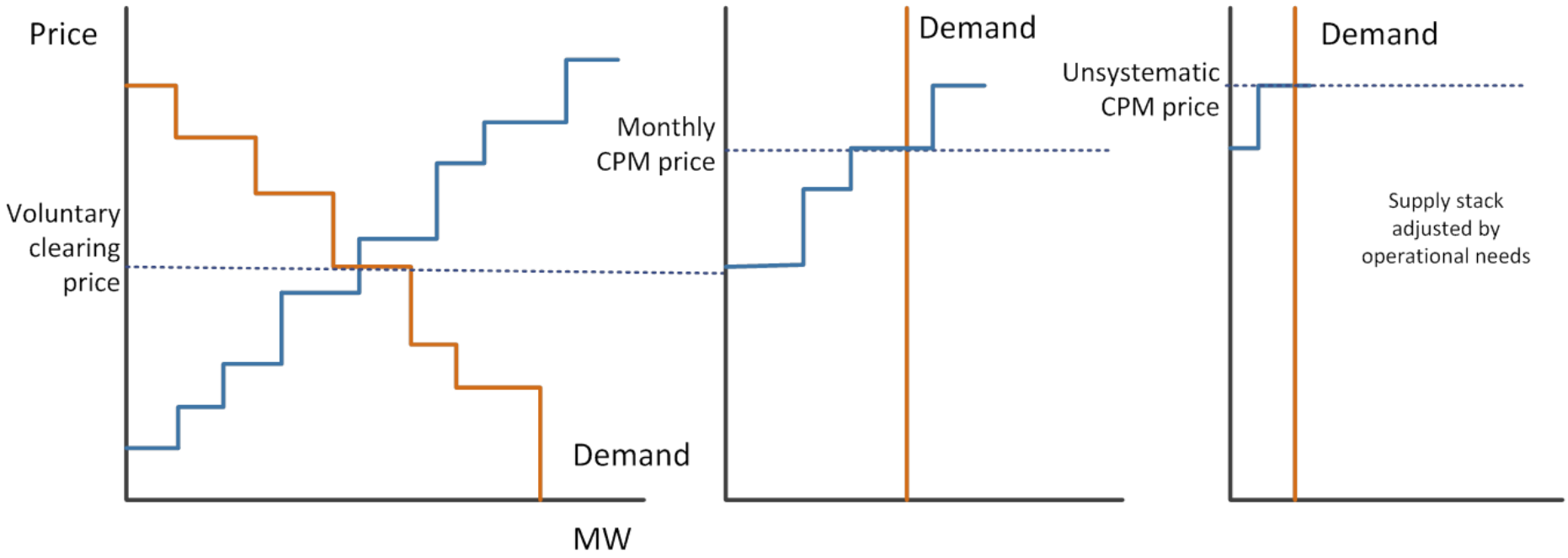
Split auction timeline



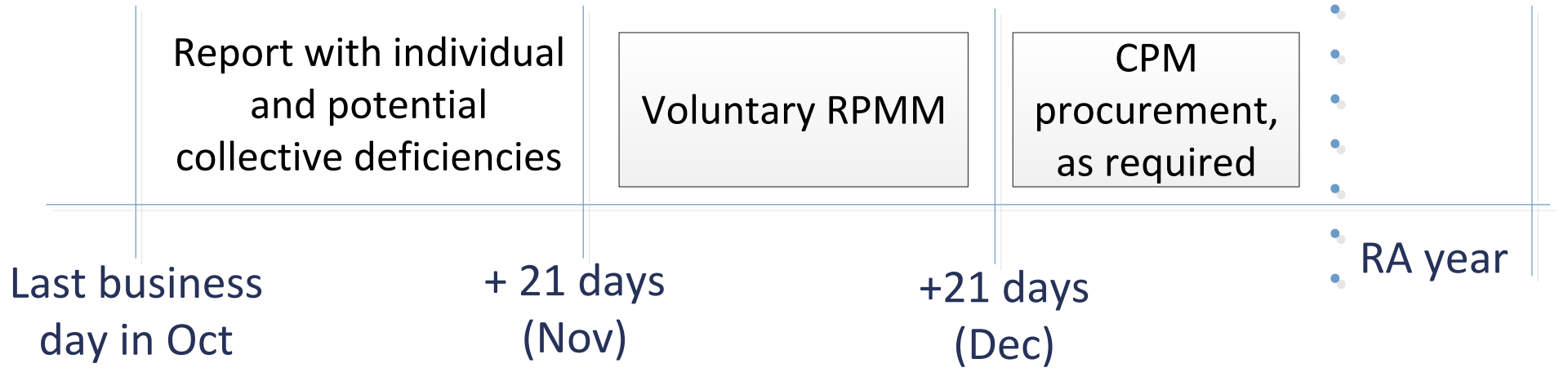
Split auction conceptual example



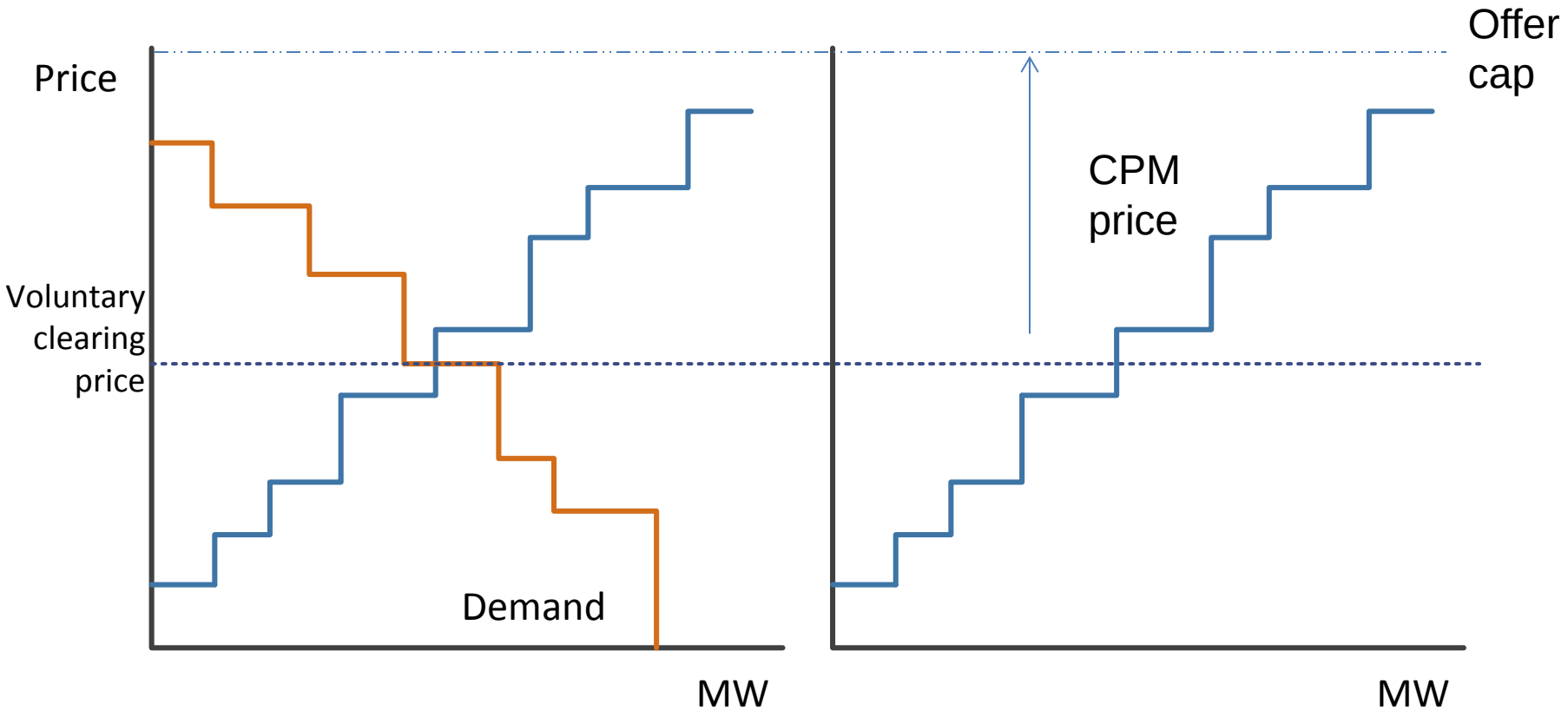
Split auction conceptual example



Voluntary auction only timeline



Voluntary auction only conceptual example



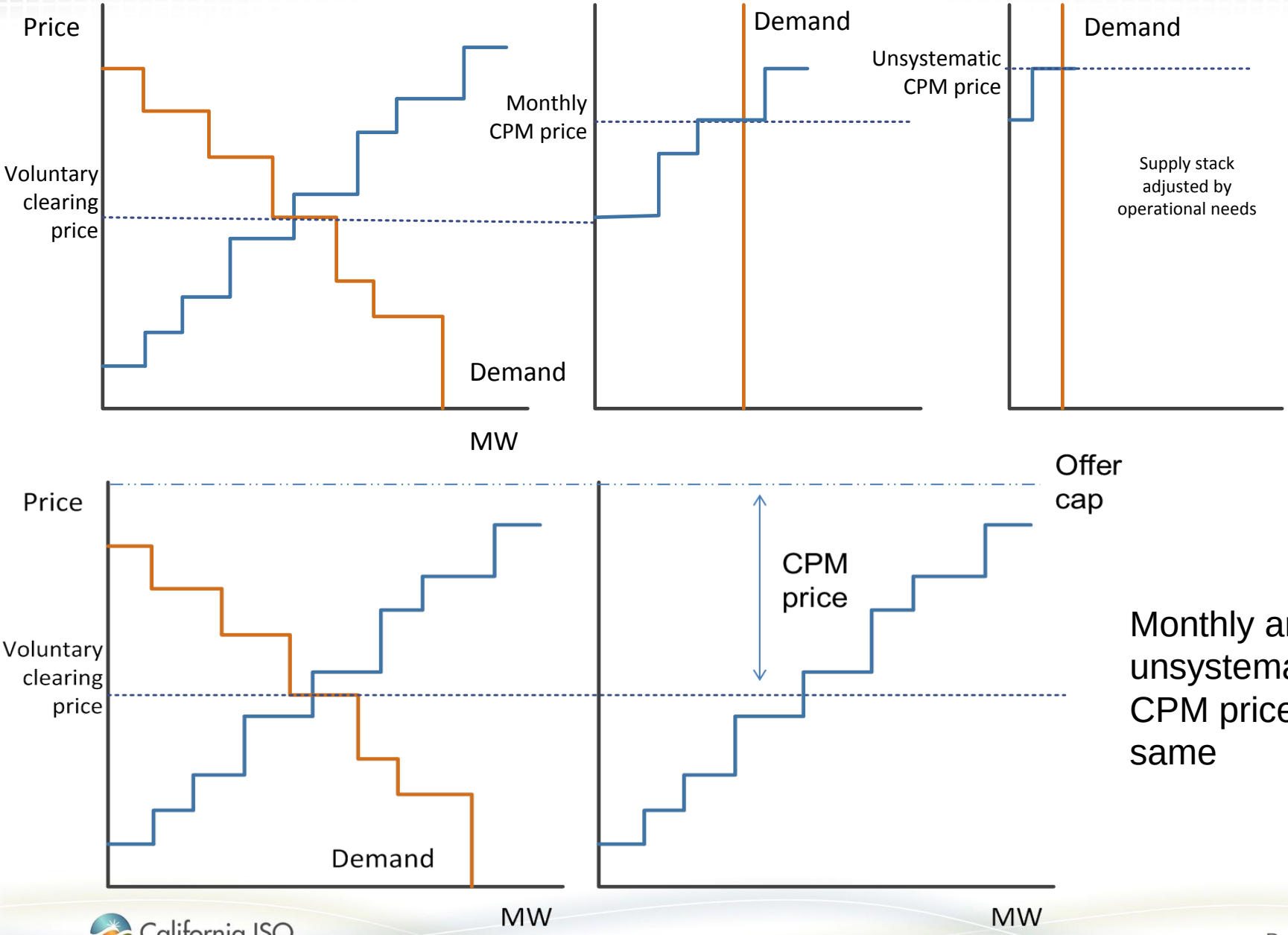
CPM price under split auction and voluntary only auction

Split auction

- Annual CPM price result of first run of backstop auction
- Monthly CPM price result of first run of backstop auction
- Unsystematic CPM price result of second run of backstop auction

Voluntary auction

- Annual CPM price derived from annual voluntary auction
- Monthly CPM price derived from monthly voluntary auction
- Unsystematic CPM price derived from monthly voluntary auction



Monthly and unsystematic CPM price the same

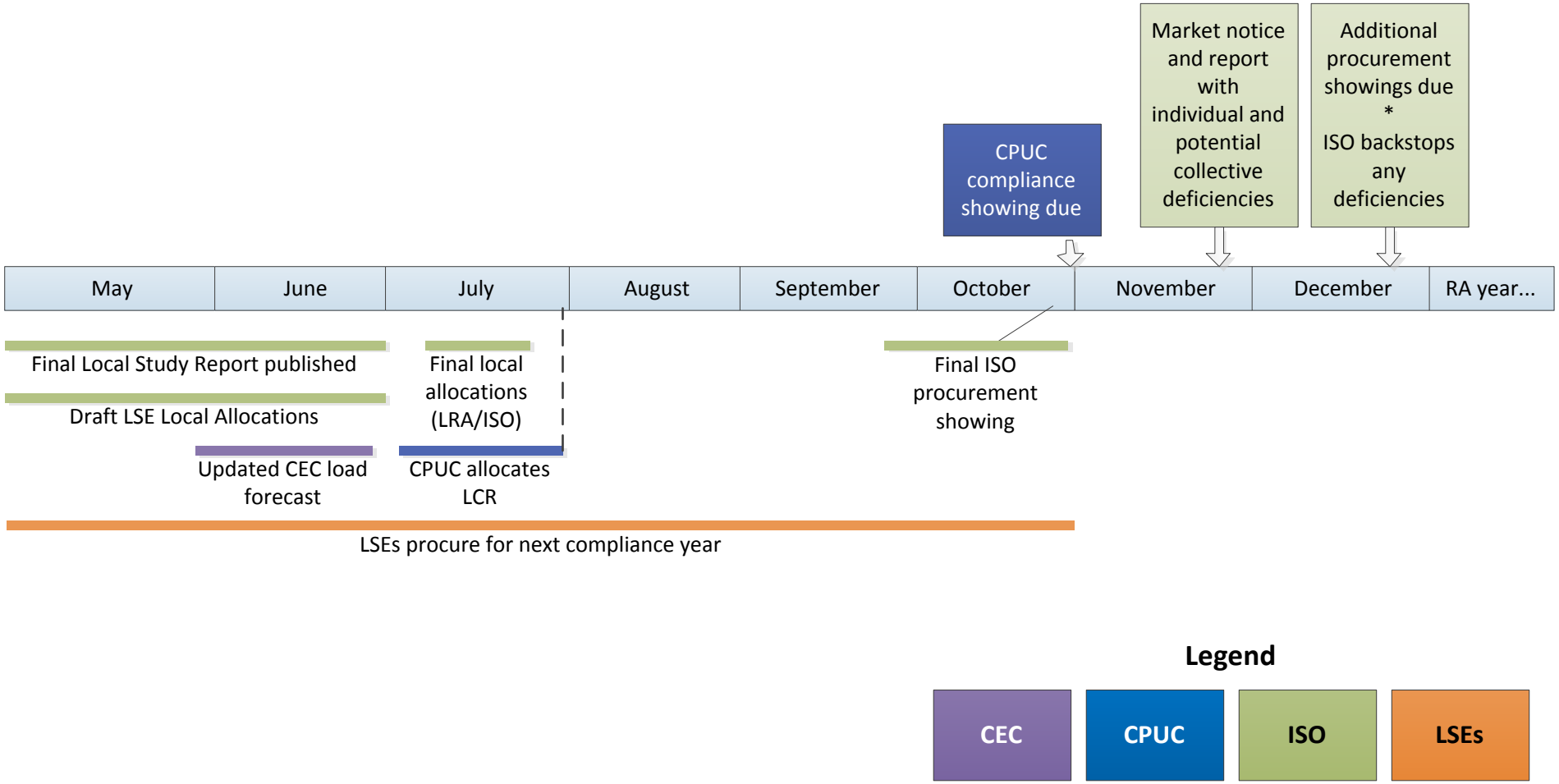
Timing options

- The split and voluntary auction only can be run prior to the annual and monthly compliance deadline
- The combined auction must be run after the annual and monthly compliance deadline

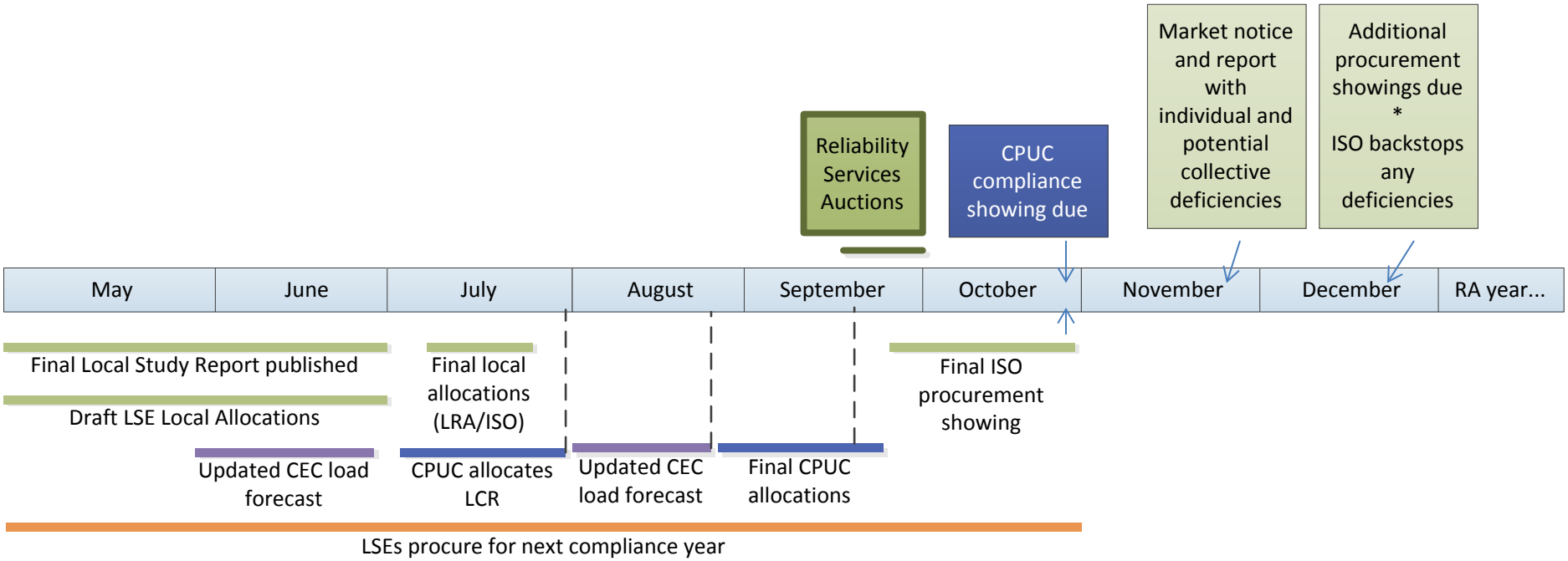
Coordination with CPUC processes

- CPUC comments indicate a preference that any voluntary auction should run prior to CPUC compliance showing to enable CPUC to maintain current RA penalty structure
- The ISO will seek to minimize changes to the CPUC RA program throughout the market design process
- Therefore, the ISO proposes an auction that occurs prior to the CPUC compliance due date on the last business day of October

Annual capacity procurement processes



Revised timeframe for voluntary auction



Legend

CEC | CPUC | ISO | LSEs

Auction options

- The ISO proposes to move forward with either the split auction or voluntary only auction
- In either case, the ISO will have to develop a voluntary auction
- The ISO proposes to concurrently develop proposals for
  - a mandatory backstop auction (second part of split auction)
  - a market-based CPM price derived from the voluntary auction

RELIABILITY SERVICES AUCTION DESIGN

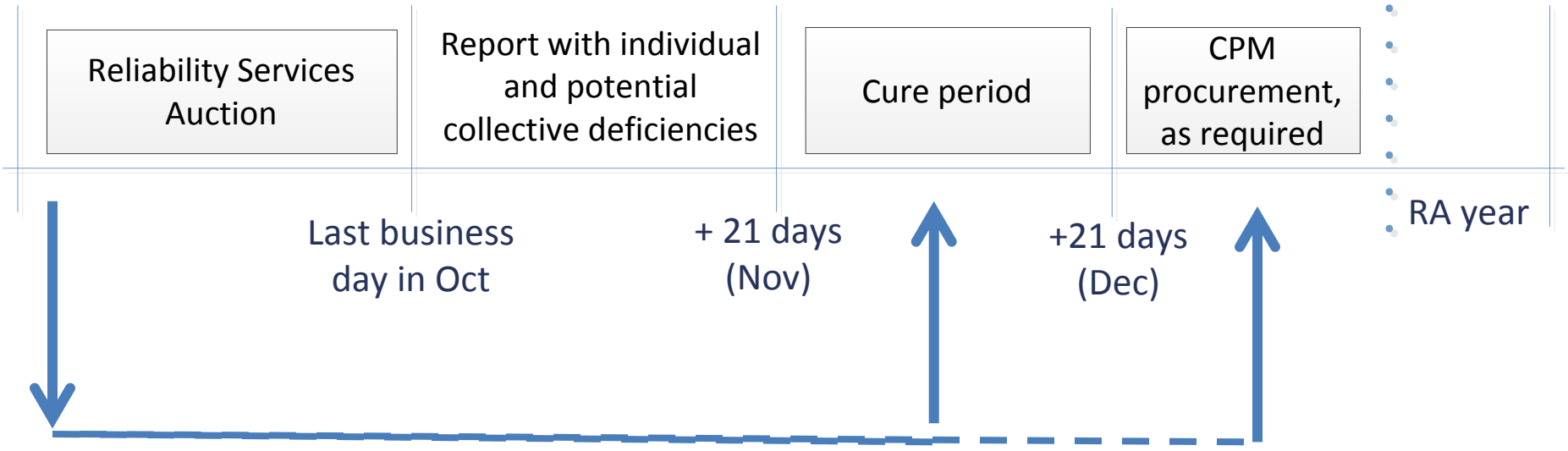
Design Overview

- Summary
- Timeline
- Liquidity
- Product
- Optimization
- Market power
  - Price floor
  - Offer cap

Summary: Reliability Services Auction

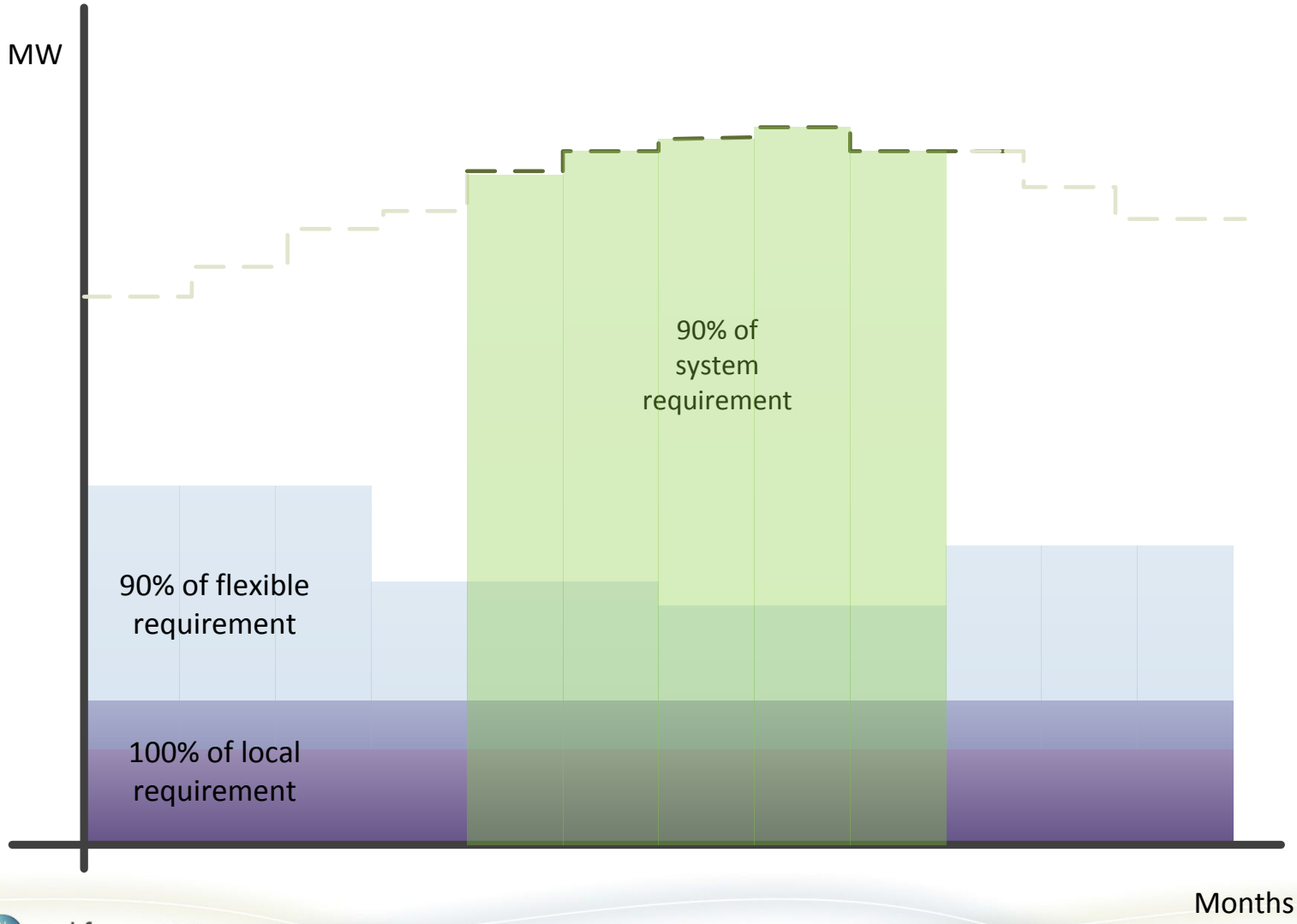
- The ISO proposes the Reliability Services Auction (RSA) as the forward residual capacity auction envisioned in the Joint Reliability Plan
- ISO acts as a clearinghouse for supply and demand bids
- The auction is voluntary from the perspective of the supplier and the buyer
- The auction can run annually and monthly
- The ISO proposes to first develop the annual auction and then consider the monthly design

Timeline: Annual Reliability Services Auction timeline

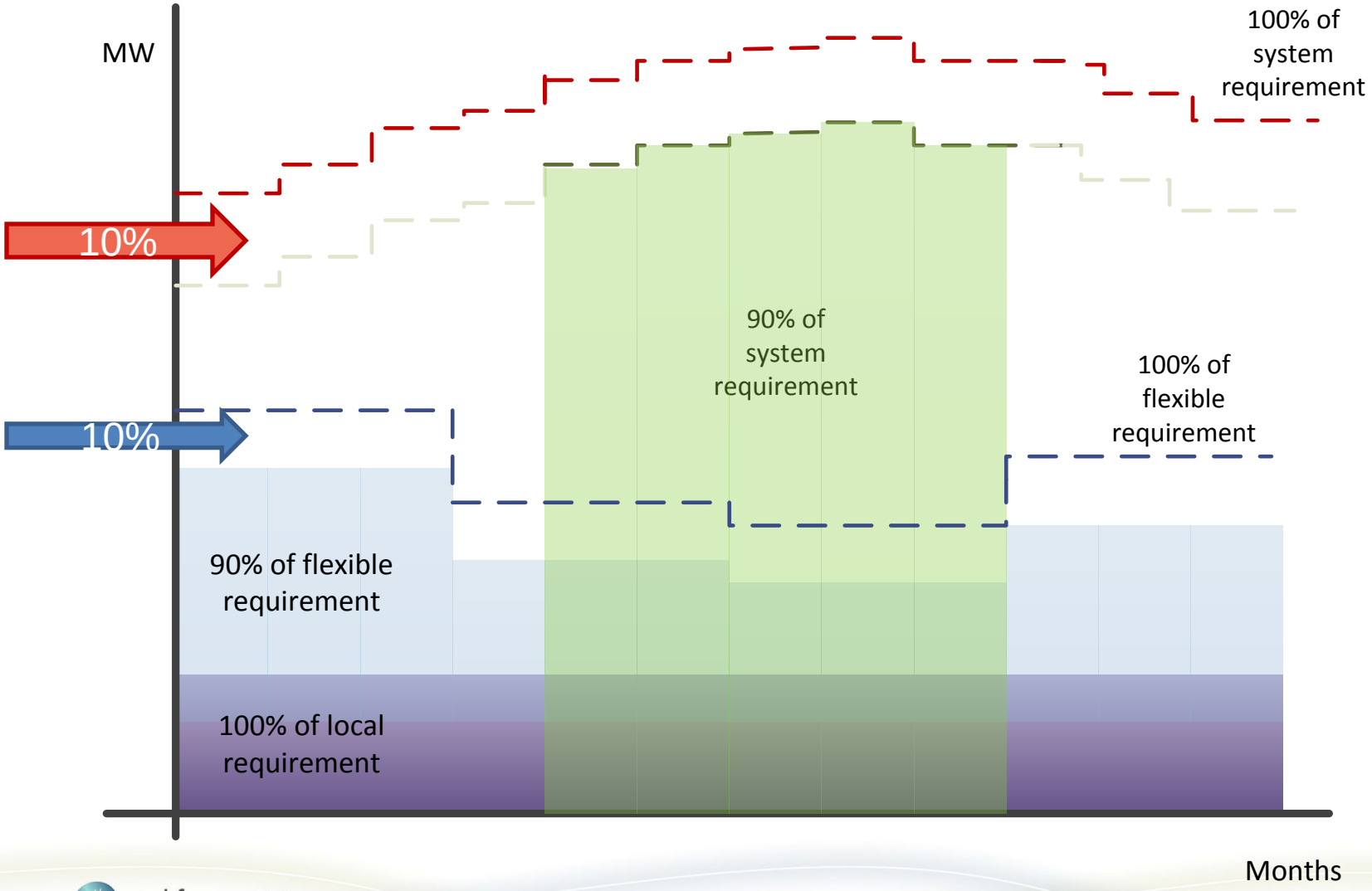


Voluntary auction runs prior to LRA and ISO compliance showings and cure period

Liquidity: CPUC annual requirements

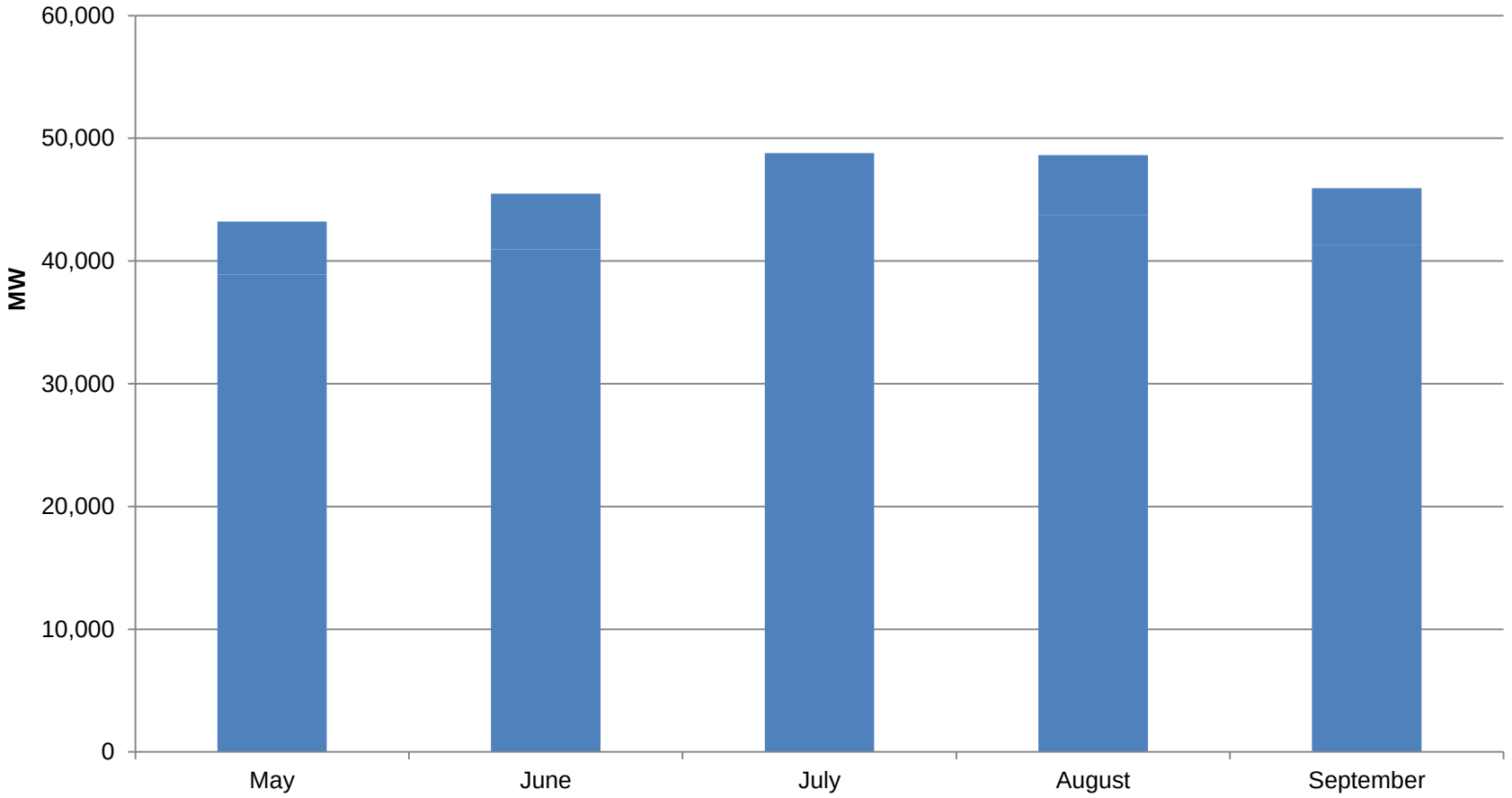


Liquidity: Potential demand for residual procurement

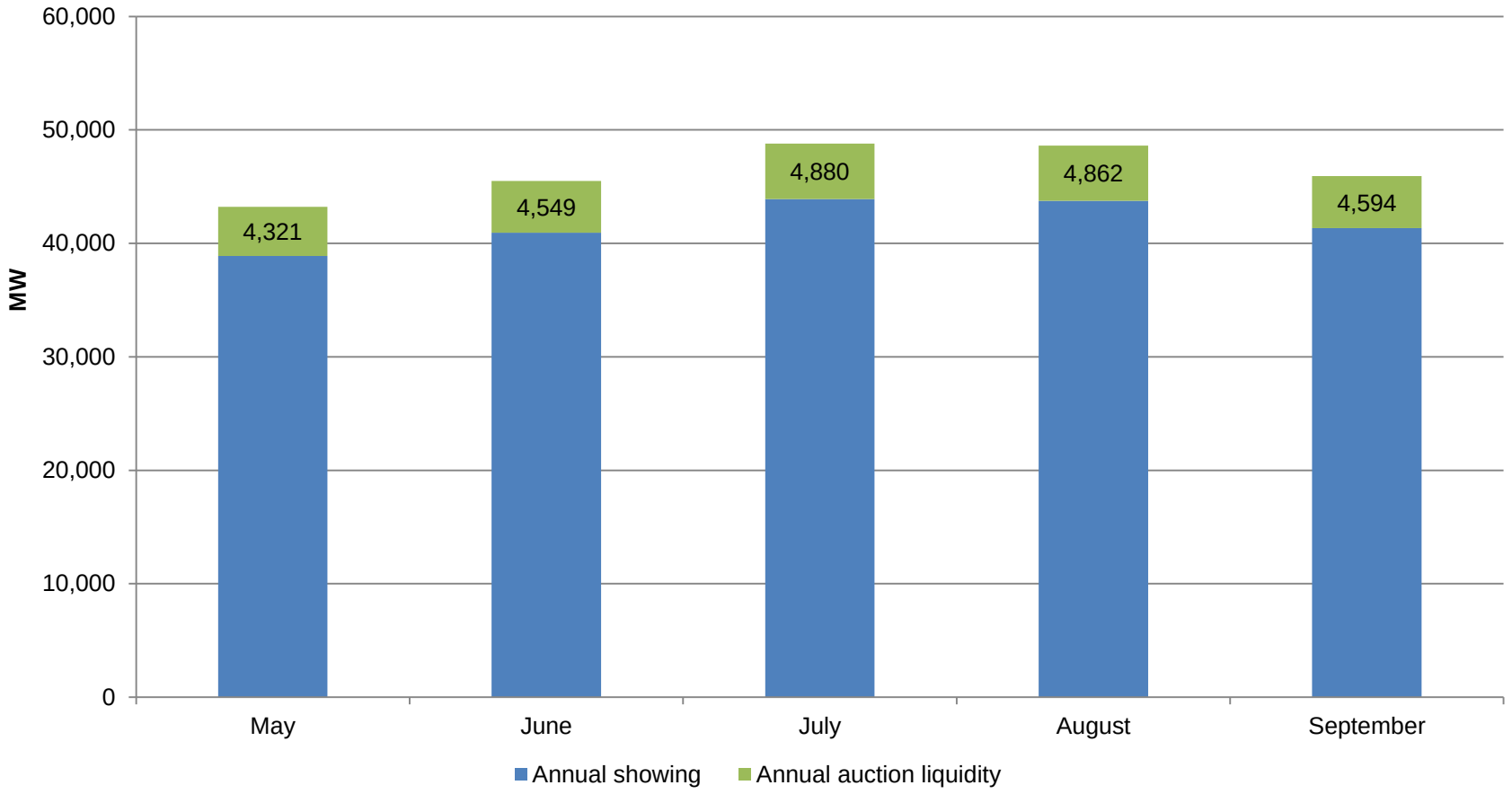


LIQUIDITY: ANALYSIS OF 2013 ISO RESOURCE ADEQUACY SHOWINGS & REQUIREMENTS FROM MAY- SEPTEMBER

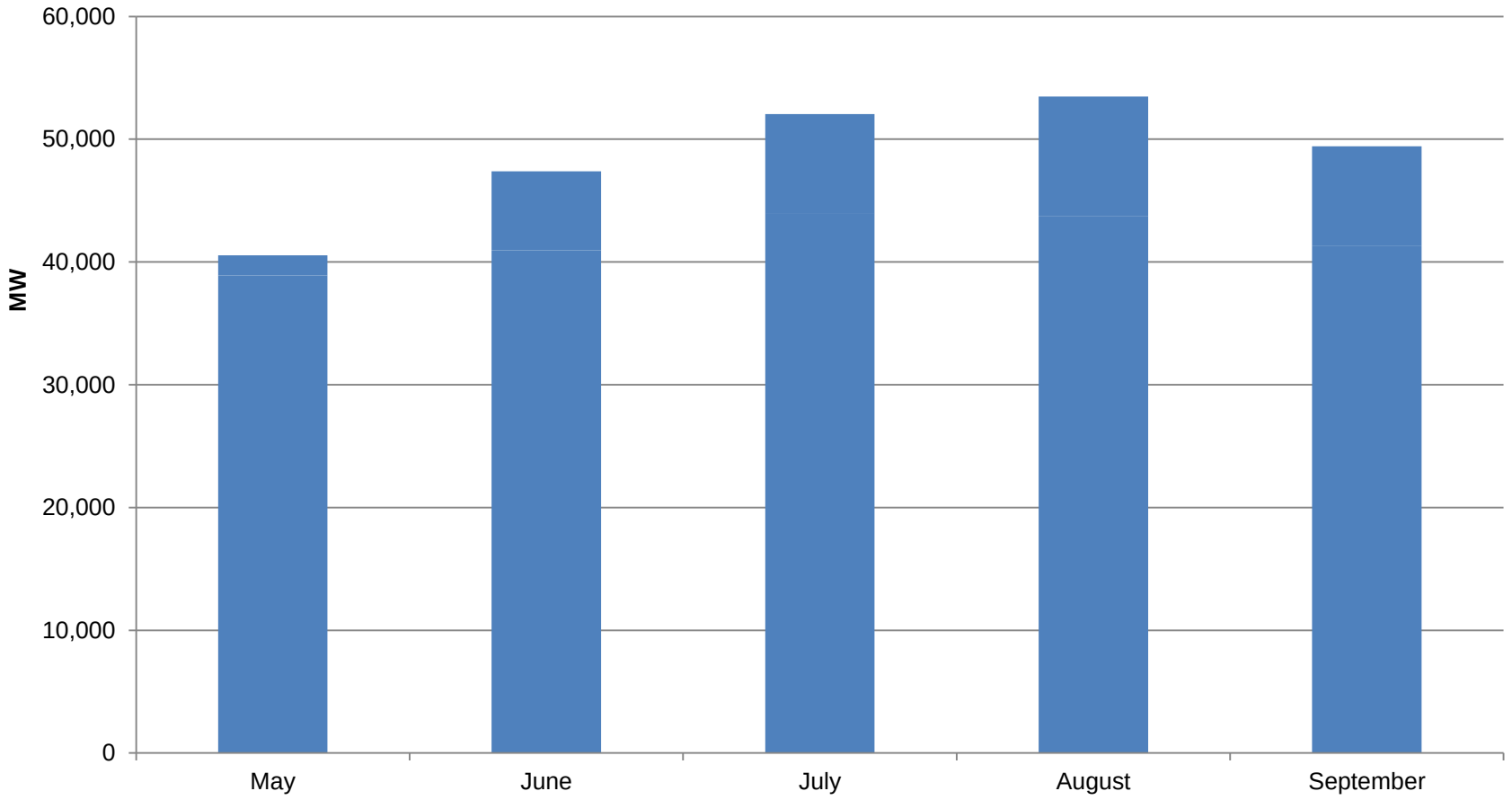
2013 total system requirement as of Sept 18th, 2012



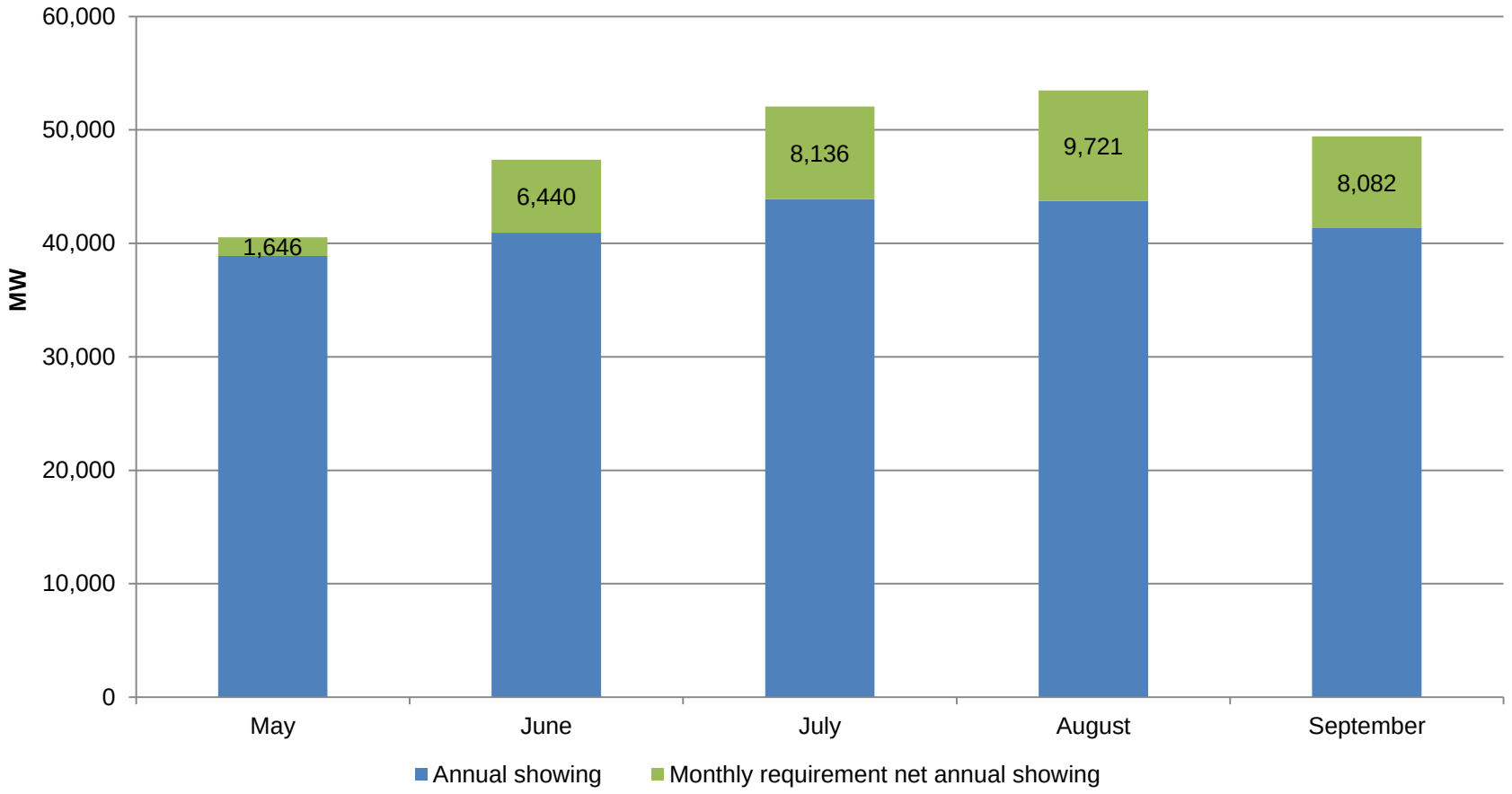
2013 annual ISO RA showings and requirement



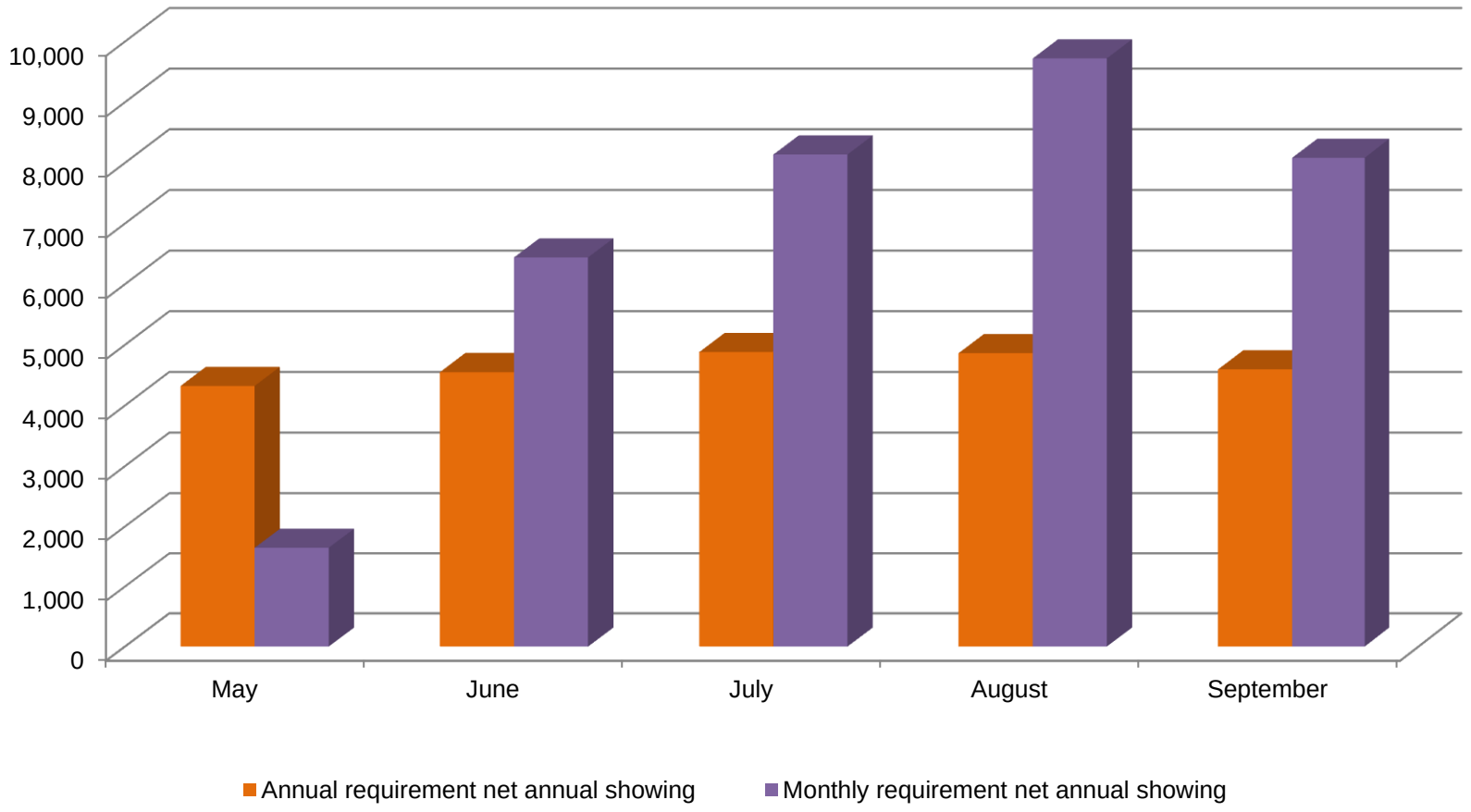
2013 total system requirement as of t-45 to each month



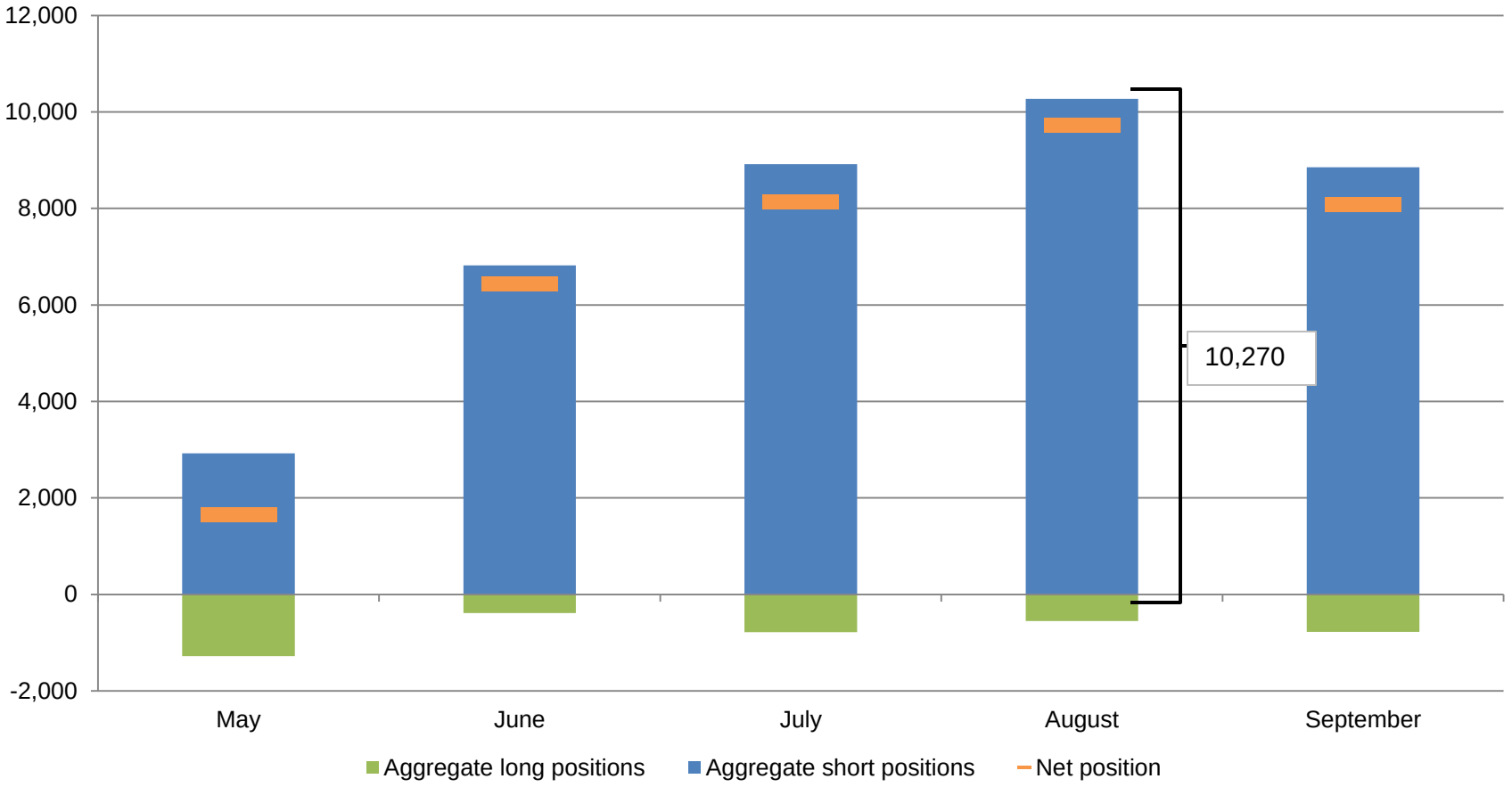
Monthly requirement and annual showing by month



Potential demand in annual and monthly RSA by month



Combined total potential demand in annual and monthly RSA



Product: Standardized products

- Standardized product developed in RSI
  - fungible and can be easily traded
  - bound by the availability standards and incentives
- Product types
  - Single system product
  - Three flexible products based on categories defined in FRAC MOO
- Capacity cleared is firm to the ISO and the Buyer (seller replaces outages)
- Generic and flexible attributes are unbundled

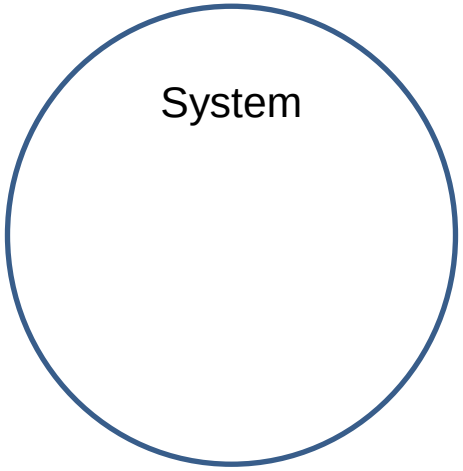
Product: Product term

Annual auction product term options:

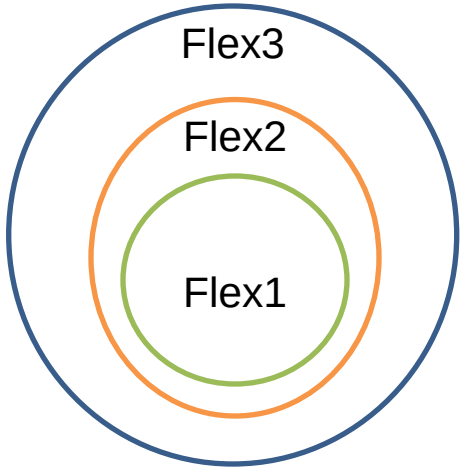
- Minimum 1 month term
- Annual strip
- Seasonal strip
- It may be an option to allow the auction to optimize between bids and timeframes
- For example, Seller can offer for the same MWs:
  - Annual strip at price A
  - Seasonal strip at price B
  - Monthly term at price C

Optimization: Basic structure

- Optimization would procure two products, system and flexible capacity, against bid-in demand for products
- Define various degrees of qualities within flexible product
  - Allow higher quality to help meet requirement of lower quality when economical



System capacity



Flexible capacity

Optimization overview: demand bidding rules

- LSEs submit demand bids to procure product for desired term
- If economic, demand may be met by a procuring a higher quality product

Optimization overview: supply bidding rules

- Scheduling coordinators can submit bids for all products for which the resource meets minimum requirements
  - Up to NQC for system capacity and EFC for flexible capacity
  - Only allow bids for the highest quality flexible and system product they qualify for
- Allow scheduling coordinators to submit bids to provide both system and flexible capacity if resource meets both minimum requirements
  - Up to min(NQC,EFC)
  - If awarded, subject to system and flexible MOO

Market power

- The existence of a market mechanism does not create market power
  - If it exists in the residual bilateral market it has the potential to exist in the residual capacity market
- Market power can be on the demand or supply side
- The design will have to include market power mitigation features

Demand side market power mitigation

- Price floor options
  - Applies to:
    - All capacity
    - New gas-fired generation only

Supply side power mitigation

- Offer cap options:
  - Fixed going forward cost by technology type multiplied by adder
  - CPUC suggested 2x average RA price
  - Net CONE
  - Others

COMMENTS

Comments

- Responses to issue paper comments posted on Tuesday, March 25th, 2014
- Responses to February 24th Working Group will be posted in April
- Comments on March 27th Working Group due April, 9th 2014
- There will not be a comments template

APPENDIX
WORKING DOCUMENTS

Excerpts from FERC Order on Tariff Revisions 3/17/11

Docket No. ER11-2256-000

57. …CAISO, in this filing, has not explained how the use of going-forward costs for CPM compensation will provide incentives or revenue sufficiency for resources to perform long-term maintenance or make improvements that may be necessary to satisfy new environmental requirements or address reliability needs associated with renewable resource integration. On the other hand, we also are not persuaded that parties have provided sufficient evidence that pricing backstop capacity compensation on the basis of CONE will yield a just and reasonable capacity rate for non-resource adequacy resources.

Excerpts from FERC Order on Tariff Revisions 3/17/11

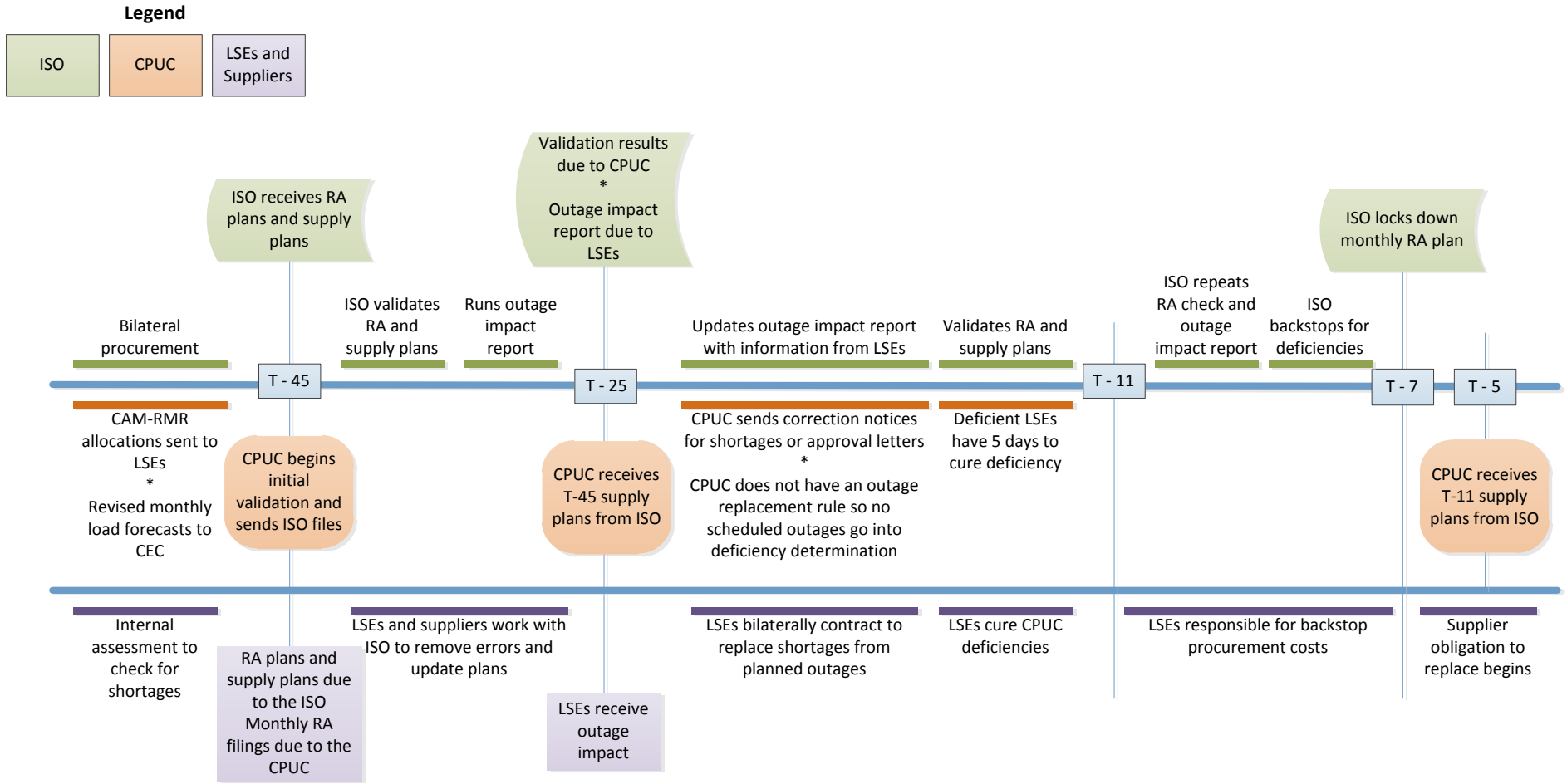
Docket No. ER11-2256-000

58. Furthermore, and significantly, we find the continuation of a fixed going-forward cost price has not been shown to be just and reasonable because of the likelihood that market conditions, which can affect the price of capacity, will fluctuate over time…. resource adequacy compensation has the potential to fluctuate over time based on changes in system conditions and the amount of capacity available to meet reliability needs.

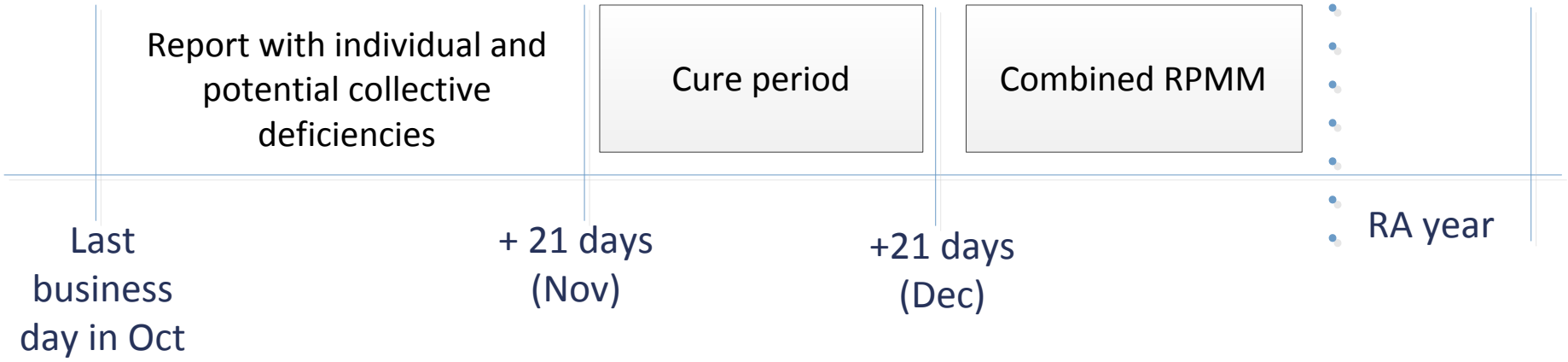
FLRR Order

68. Given the problems with the out-of-market approach taken by CAISO in the FLRR proposal, the Commission finds that further efforts to refine the details of the FLRR proposal would not achieve a just and reasonable result. Thus, we encourage CAISO and its stakeholders to focus on the development of a durable, market-based mechanism that provides incentives to ensure that resources with the adequacy and operational needs CAISO requires are available to meet system needs.

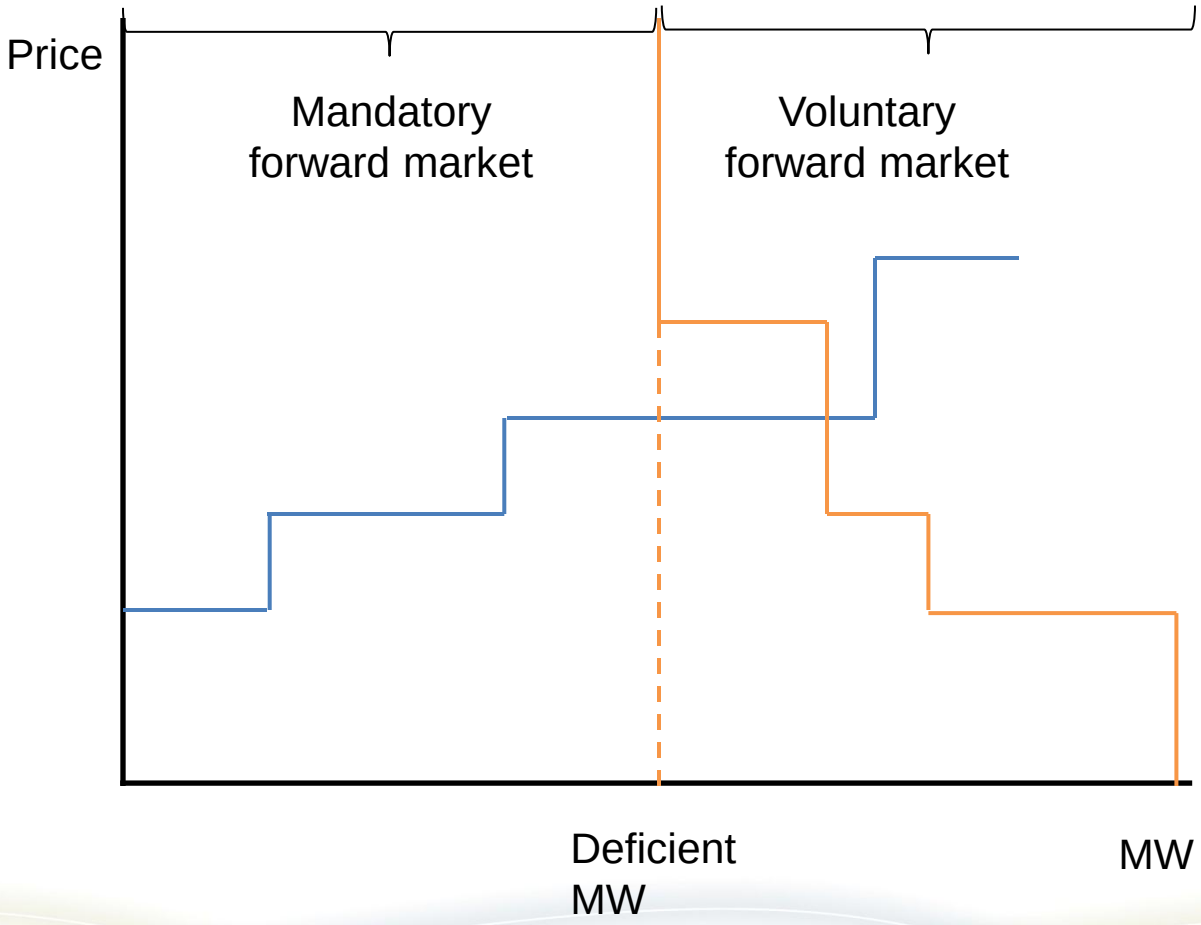
Monthly residual procurement



Combined auction timeline



Combined auction conceptual example



Combined auction numerical example

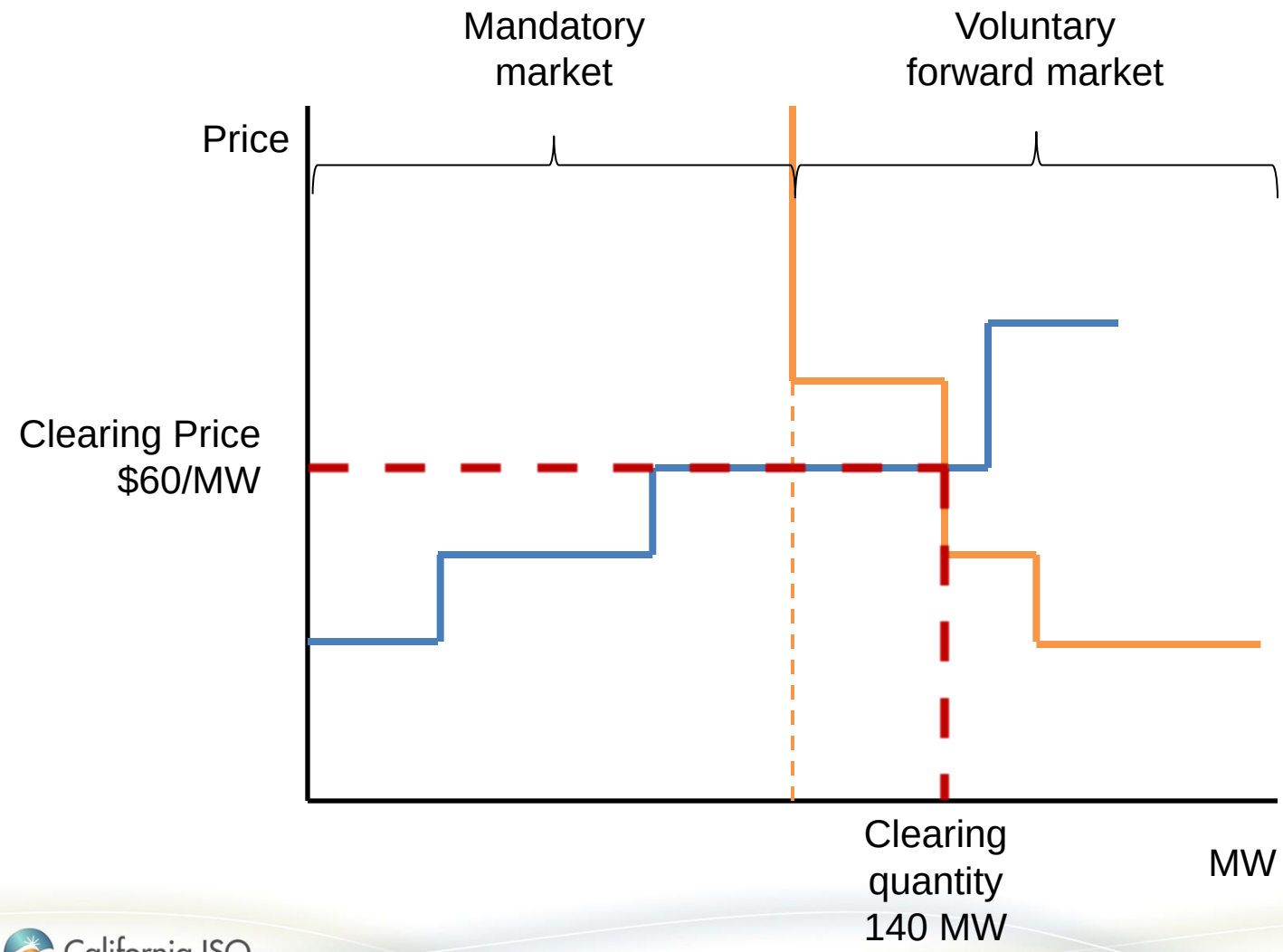
Demand - Four LSEs

- Only one (LSE 1) is *required* to procure 100MW (price taker)
- LSE 2 bids for 40 MW at $60/MW
- LSE 3 bids for 10 MW at $40/MW
- LSE 4 bids for 50 MW at $30/MW

Supply – Four voluntary suppliers

- Gen A offers 25 MW at $30/MW
- Gen B offers 40 MW at $40/MW
- Gen C offers 80 MW at $50/MW
- Gen D offers 25 MW at $70/MW

Combined auction numerical example



Combined auction numerical example results

- Market clearing price $60/MW
- Market clearing quantity 140 MW

- LSE 1 purchases 100MW at $60/MW
- LSE 2 purchases 40MW at $60/MW (willing to pay up to $60/MW)
- LSE 3 and LSE 4 purchase 0 MW (only willing to pay up to $40/MW and $30/MW)

- Gen A sells 25 MW at $60/MW
- Gen B sells 40 MW at $60/MW
- Gen C sells 75 MW at $60/MW
- Gen D sells 0 MW (only willing to sell if price was at least $70/MW)