

A MARKET DESIGN PERSPECTIVE ON ARGUMENTS REGARDING LOAD OBLIGATION TRADING

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I. INTRODUCTION

The California Public Utilities Commission (the Commission) is presently considering a proposal to allow trading of Slice-of-Day (SOD) Resource Adequacy (RA) obligations. In this paper, Forward Market Design (FMD) seeks to clarify the source of disagreement in the record regarding hourly load obligation trading. In FMD's reading, the principal divergence is not necessarily over the underlying facts, but over the evaluative standard applied to those facts. Some parties appear to assess transactability by asking whether the current framework permits Load-Serving Entities (LSEs) to satisfy their obligations. Others appear to assess it by asking whether those obligations can be satisfied efficiently and at least cost. The current record suggests that, although compliance has been achieved under the existing framework, there are indications of excess cost associated with portfolio misalignment and with limited opportunities to reallocate obligations across entities. To the extent such costs exist, they are relevant to the overall cost of achieving the Commission's reliability objectives and, ultimately, to customer costs.

FMD does not take a position in this paper on the ultimate policy outcome. Rather, the analysis is intended to provide a neutral framework for understanding the differing perspectives in the record and for interpreting the range of cost estimates presented in this proceeding.

II. PARTIES DISAGREE ON WHETHER THE RELEVANT STANDARD IS EFFICIENCY OR FEASIBILITY

The record suggests that the principal disagreement regarding hourly load obligation trading (LOT) is not over the underlying facts, but over the standard used to evaluate those facts.

1. **Cost-efficiency**—Parties supporting LOT, including CalCCA and Ava Community Energy, generally appear to assess the issue under a cost-efficiency standard.^{1,2} Under that approach, the relevant question is whether the Commission's reliability requirement could be satisfied at lower cost if hourly obligations could be reallocated across LSEs.
2. **RA feasibility**—By contrast, parties opposing LOT, including Vistra and Middle River Power, generally appear to assess the issue under a feasibility standard.^{3,4} Under that approach, the

¹ *Ava Community Energy Comments Opening Comments on Transactability Issues*, Rulemaking 25-10-003, March 16, 2026

² *California Community Choice Association's Opening Comments on Transactability Issues Filed and Served*, Rulemaking 25-10-003, March 16, 2026

³ *Vistra Corp. Comments on Track 1 Transactability Report and Proposals*, Rulemaking 25-10-003, March 16, 2026

⁴ *Middle River Power LLC Opening Comments on Transactability Issues*, Rulemaking 25-10-003, March 16, 2026

relevant question is whether LSEs can comply using existing RA products and market mechanisms, even in the absence of LOT.

These two standards can lead to different conclusions based on the same factual record. A framework may be feasible in the sense that all parties ultimately comply, while also being inefficient in the sense that compliance is achieved through avoidable over-procurement or other unnecessary costs. In our view, this distinction helps explain much of the apparent tension in the record.

III. PRIOR COMMISSION DECISIONS HIGHLIGHT EFFICIENCY

Several Commission decisions appear to support evaluation of transactability using an efficiency-oriented standard rather than a strict necessity test. Most notably, the Commission’s adoption of implementation principles in Decision 21-07-014 placed emphasis on achieving reliability objectives in a practical and economically coherent manner. In particular, under Principle 1: Balance a Reliable Electrical Grid with Minimizing Costs to Customers, the Commission decided to consider “*which proposals best address a reliable electrical grid that **minimizes costs to customers***” (emphasis added).⁵ In addition, subsequent decisions (D.22-06-050 and D.23-04-010) indicated that the Commission would revisit LOT if “*transactability or **inefficiency** concerns arise*” (emphasis added) under implementation.⁶ Taken together, these decisions appear to indicate that the relevant inquiry is not limited to whether the framework can produce compliance, but also extends to whether reliability objectives are achieved in a cost-minimizing manner.

In practical terms, the cost of complying with SOD obligations is not borne solely by LSEs, but is ultimately reflected in the costs paid by end-use customers. Resource adequacy procurement costs are generally recoverable through retail rates through a variety of cost recovery and allocation mechanisms.⁷ As a result, an increase in the cost of satisfying a given reliability standard—whether arising from portfolio misalignment, limited transactability, or other sources of procurement inefficiency—would be expected to increase customer costs as well.

In this context, even relatively modest inefficiencies in how RA obligations are met may produce material aggregate costs when considered across the system. Evaluating transactability through an efficiency lens

⁵ D.21-07-014, Decision on Track 3B.2 Issues: Restructure of the Resource Adequacy Program, p. 29 (July 16, 2021),

⁶ D.22-06-50, Decision Adopting Local Capacity Obligations For 2023 - 2025, Flexible Capacity Obligations For 2023, And Reform Track Framework, p. 97 (June 24, 2022) and D.23-04-010, Decision on Phase 2 of the Resource Adequacy Reform Track, p. 72 (April 7, 2023),

⁷ See Current Trends in California’s Resource Adequacy Program, Energy Division Working Draft Staff Proposal, Feb 16, 2018, and 2023 Resource Adequacy Report, Energy Division, August 2025

therefore appears consistent not only with the Commission’s prior decisions, but also with Principle 1’s objective of maintaining reliability while minimizing costs to customers.

IV. BRIDGING THE ENERGY DIVISION AND CALCCA ESTIMATES

The Energy Division (ED) report and the CalCCA study appear to agree on the central point relevant to LOT: under the current framework, the absence of LOT increases the cost of achieving the Commission’s reliability standard. The principal difference between the two analyses concerns the magnitude of that cost. The ED report also identifies practical administrative concerns associated with implementing LOT. In prior work, FMD discussed how an SOD intermediary could mitigate several of those implementation concerns. This section focuses more narrowly on the quantitative estimates in the record and offers a framework for understanding where the ED and CalCCA analyses diverge and where they may be more consistent than they initially appear.

Table 1 presents the most comparable estimates from the two studies. In both cases, the estimate reflects the additional cost incurred in September 2025 as a result of limited transactability. The ED estimate is based on all LSEs under CPUC jurisdiction, whereas the CalCCA estimate is based on 24 CCAs.

Table 1: Benefits of SOD trading

Estimation	Reference		Benefits September 2025 (\$M)
	Volume (MW)	Price (\$ / kW-month)	
ED (Optimized Portfolio)	678	11.21	7.60
CalCCA (Obligation: SOD)	823	26.00	21.4

The difference between these estimates can be usefully decomposed into two components: the quantity of avoidable procurement and the price assigned to that procurement. This is a simple $p \times q$ framework. Although this decomposition does not resolve all methodological differences between the studies, it helps identify more clearly the dimensions along which the estimates differ.

Price impact

The Energy Division used the 2025 RA Market Price Benchmark (“MPB”) whereas CalCCA used observed capacity-weighted average price of RA sold to California LSEs during the period between the year-ahead filings (October 31, 2023) and the final RA filing date 45 days before the start of the operating month.⁸

FMD does not take a position on the correct level of these price estimates as such (i.e., \$11.21 vs \$26.00 KW-month). However, the two figures appear to represent different economic concepts. The MPB appears to reflect an average price derived from a broader portfolio of transactions over a longer period, whereas the CalCCA estimate appears closer to the price of more recent and, in that sense, more marginal transactions.⁹

Decision D.25-06-049 modified the RA MPB methodology previously adopted in D.19-10-001. Among other changes, the revised methodology considers the volume-weighted average of IOU, CCA, and ESP RA market transactions executed from December 2021 through August 2025 for delivery in 2025. Before that change, the RA MPB was based on a shorter-term estimate using a smaller set of more recent transactions, as described in the 2024–2025 Resource Adequacy Market Price Benchmark Report.¹⁰ Table 2 summarizes the resulting price points.

Table 2: Prices

Source	Price (\$ / kW-month)
2024 System Forecast MPB (previous methodology)	26.26
2025 System Forecast MPB (previous methodology)	40.31
2025 Final MPB (new methodology)	11.21

⁸ Report on Transactability within the Slice of Day Resource Adequacy Framework, R.25-10-003 (Feb. 2026) (Transactability Report) at p. 25 and Andrew Mills, Effective Mechanisms for Slice-of-Day RA Trading, April 24, 2025 (CalCCA Study) at p. 22

⁹ Table 1. 2025 Final Market Price Benchmarks Used in PCIA Calculations, Market Price Benchmark Calculations 2025, California Public Utilities Commission (Oct. 1, 2025).

¹⁰ Energy Division Staff Report of the 2024- 2025 Resource Adequacy Market Price Benchmark, Feb 26, 2025

For purposes of estimating the cost associated with the absence of LOT, the more economically relevant concept appears to be the marginal price of compliance rather than the average price of a broader portfolio. An LSE that is short in a particular hour does not procure an average historical portfolio; it procures the incremental resource needed to cure the shortfall. In tight conditions, that incremental procurement would generally be expected to clear at a marginal compliance price. For that reason, a marginal price framework appears more closely aligned with the question presented here.

Quantity impact

On the quantity side, the disagreement is narrower in numerical terms, but the CalCCA approach continues to focus on hours of scarcity while the ED considers a broader average.

Specifically, the ED's optimized portfolio scenario identifies approximately 678 MW of avoidable procurement by first identifying 16,269 MWh of unused storage and then spreading that quantity evenly across 24 hours ($16,269 / 24 = 678$). That estimate covers all LSEs under CPUC jurisdiction. CalCCA, by contrast, uses an optimization approach to estimate that 823 MW of procurement would not be required, based only on 24 CCAs.

In its comments, CalCCA argued that the unused storage identified by the ED could instead be allocated to reduce thermal procurement in the most constrained hours, rather than spread evenly across all 24 hours. On that basis, CalCCA suggested that the same 16,269 MWh of storage could offset approximately 2,175 MW of thermal procurement when targeted to the most critical 7.5 hours ($16,269 / 7.5 = 2,175$). CEJA and Sierra Club similarly noted the inefficiency associated with a less targeted use of available storage.¹¹

FMD's observation is not that the record establishes a single definitive quantity estimate, but that the current estimate could likely be refined using the tools already available to the ED. Based on our understanding of the optimization problem and the data currently in the record, a more informative estimate appears readily accessible through a simple search procedure using the ED's existing Excel model and data. Starting from the current thermal procurement quantity, the model could reduce thermal capacity incrementally (say by 100 MW at a time) and re-optimize available storage at each step until the minimum compliant thermal quantity is identified.¹² That approach would more directly measure the

¹¹ California Environmental Justice Alliance and Sierra Club Comments on The Transactability Report, Rulemaking 25-10-003, March 16, 2026.

¹² The problem could also be solved in one step using a proper optimization routine (similar to CalCCA's approach) and even a using the Excel tool (used by the ED) in combination with binary search.

extent to which unused storage can substitute for thermal capacity in the most constrained hours. Table 3 presents the estimates available to date.

Table 3: Quantities

Source	Quantity (MW)
Unused Storage / 24 hrs.	678
Unused Storage / 7.5 hrs.	2,175
Unused Storage optimally allocated	TBD

Results

Using the estimates currently in the record, the excess cost associated with the absence of LOT appears to fall within a broad range of approximately \$122 million to \$283 million for the five summer months, inclusive of direct and indirect costs across all LSEs.

Table 4 illustrates that range by applying the preliminary 2,175 MW quantity estimate together with the two price points reflected in the record. It also applies scaling factors derived from the CalCCA study to translate September estimates into estimates for the full summer period and to convert direct costs into total costs. Specifically, the CalCCA study implies that the direct cost for the five summer months is approximately 2.9 times the September cost, and that total cost (direct plus indirect) is approximately 1.7 times direct cost.

Table 4: Cost

		Excess cost at \$11.21 kW-month (\$ millions)	Excess cost at \$26.00 kW-month (\$ millions)
September 2025		24	56
All summer months (Direct)	(September x 2.9)	70	163
All summer months (Total)	(Direct x 1.7)	122	283

Taken together, the ED and CalCCA analyses appear to support the same general conclusion: in the absence of LOT, compliance with the Commission's reliability standard is more costly than it would be

under a framework with greater transactability. The principal differences in the record concern how that cost should be measured. In FMD's view, the marginal price of compliance appears to be the more relevant price concept, and the quantity estimate appears capable of refinement using the ED's existing Excel tool and underlying data. A simple iterative search of the kind described above could provide a more precise estimate of avoidable procurement and, in combination with a marginal-price approach, could offer the Commission a practical and transparent basis for assessing the customer cost implications of the current non-transactable SOD framework.

V. CONCLUSION

FMD respectfully offers the following observations based on the current record.

First, the Energy Division and CalCCA analyses appear to converge on the central point that, absent LOT, LSEs incur additional costs in meeting the Commission's reliability standard. The principal difference between the two analyses concerns the magnitude of those costs, rather than whether some excess cost exists.

Second, the relevant evaluative framework appears to be the Commission's Principle 1, which calls for balancing reliability with minimizing costs to customers. From that perspective, the relevant question is not only whether compliance can be achieved without LOT, but whether the same reliability objective can be achieved more efficiently and at lower cost.

Third, for purposes of estimating the cost of non-transactability, the marginal price appears to be the more economically relevant measure. An LSE addressing an incremental compliance shortfall would generally procure the next unit needed for compliance, rather than replicate an average historical portfolio. For that reason, a marginal compliance price appears more closely aligned with the cost at issue here.

Fourth, the quantity estimate appears capable of further refinement using tools already in the record. In particular, the Energy Division's existing Excel model and underlying data appear sufficient to support a simple iterative search that reduces thermal procurement incrementally and re-optimizes storage until the minimum compliant quantity is identified.

Taken together, the current record appears to indicate that the absence of LOT may increase the cost of achieving the Commission's reliability objectives, and that the remaining analytical questions concern how best to measure that effect. In FMD's expert view, the record now appears sufficient to support a next step in which the implementation details of LOT are further examined.