

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Oversee the
Resource Adequacy Program, Consider
Program Reforms and Refinements, and
Establish Forward Resource Adequacy
Procurement Obligations.

Rulemaking 21-10-002
(Filed October 7, 2021)

**COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR
CORPORATION ON THE RESOURCE ADEQUACY REFORM WORKSHOP REPORT**

Roger E. Collanton
General Counsel
Andrew Ulmer
Assistant General Counsel
Marissa Nava
Counsel
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: 916-963-0521
Fax: 916-608-7222
Email: mnava@caiso.com

Dated: December 1, 2022

Table of Contents

I.	Introduction.....	1
II.	Discussion.....	2
A.	Planning Reserve Margin.....	2
	1. The Commission Should Not Adopt a Single Annual Planning Reserve Margin Approach as Default	2
	2. The Commission Should Not Adopt a Two Planning Reserve Margin Approach or NRDC’s Approach as a Default Until More Concrete LOLE Study Data is Available.	3
	3. As a Default Approach, the Commission Should Set Monthly Planning Reserve Margins to Capture Reliability Needs Across The Year Precisely.....	4
B.	Resource Counting for Wind and Solar	5
	1. The CAISO Did Not Find Significant Differences between PG&E and MRP Exceedance Benchmark Calculations.....	5
	2. The Commission Should Adopt MRP’s Exceedance Selection Methodology Which Better Ensures All Benchmark Hours Are Covered by the Exceedance Level	7
	3. More Conservative Exceedance Approaches Better Account for Reliability Needs....	8
C.	Resource Counting for Co-located Resources	8
D.	UCAP-light.....	9
E.	CAISO Validation and Compliance.....	10
F.	Flexible Resource Adequacy	11
III.	Conclusion	11

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Reforms and Refinements, and Establish Forward Resource Adequacy Procurement Obligations.

Rulemaking 21-10-002
(Filed October 7, 2021)

**COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR
CORPORATION ON THE RESOURCE ADEQUACY REFORM WORKSHOP REPORT**

I. Introduction

The California Independent System Operator Corporation (CAISO) submits comments on the *Resource Adequacy Reform Working Group Report* (Report) filed on September 2, 2022. In these comments, the CAISO provides feedback on party proposals to set the planning reserve margin (PRM) under the Slice of Day framework. The CAISO recommends that the Commission set monthly PRMs (versus a single annual PRM) as the default approach to capture reliability needs across the year precisely. However, the CAISO urges the Commission to also re-evaluate PRM proposals when more concrete loss of load expectation (LOLE) study data is available for parties to understand whether approaches other than a monthly PRM approach can support reliable outcomes. The CAISO also provides analysis on wind and solar exceedance counting proposals to support a more conservative counting methodology that covers both high load and stressed grid conditions. The CAISO also provides comments cautioning that energy-only (*i.e.*, without deliverability) variable energy resources (VERs) cannot count as resource adequacy capacity but could be used to charge co-located storage resources. The CAISO also supports continued consideration of methodologies to account for forced outages in resource counting. Lastly, the CAISO emphasizes that CAISO compliance issues and flexible resource adequacy should be discussed further in a CAISO stakeholder process.

II. Discussion

A. Planning Reserve Margin

The CAISO agrees with the general process for deriving the PRM under Slice of Day described in the Report. Under that process, Energy Division determines the reliable resource portfolio through an LOLE study, then converts the portfolio to Slice of Day counting and derives the PRM using a conversion tool. As a general principle, the Commission should set the PRM such that the resource adequacy fleet is reliable and meets at most a 0.1 LOLE across the year.

1. The Commission Should Not Adopt a Single Annual PRM Approach as Default

Based on discussion and analyses presented in workshops, the CAISO has concerns about the Commission's direction to parties in Decision (D.) 22-06-050 to establish a single PRM applied to all hours of the year. A single PRM construct works well when following the industry practice in conducting LOLE analyses, which uses a single resource portfolio across the year. In this way, the annual PRM is aligned to meet the annual LOLE threshold. However, it is difficult to apply this methodology to the Commission's resource adequacy program because of the contractual shaping of resource adequacy capacity to meet 12 different monthly requirements. Astrape Consulting's (Astrape) analysis showed that applying the September (peak month) PRM to the whole year increases the loss of load risk across other months. Astrape showed that applying the September PRM to the entire year increased LOLE above the 0.1 standard to 0.4.¹ The single annual PRM approach proposed by Southern California Edison Company (SCE) also implies reliance on non-resource adequacy resources to meet a 0.1 LOLE as a result of the shaped 12 monthly resource adequacy requirements. Because load serving entities (LSEs) are not obligated to show non-resource adequacy resources to the CAISO, these resources may not be subject to CAISO resource adequacy rules such as must-offer and outage substitution obligations. Such resources may not be available to the CAISO if there are stressed conditions across the West and other LSEs seek to procure the same resources.

¹ Report, p. 124.

To understand issues with a single annual PRM approach better, Energy Division and Astrape presented “stress tests” to assess different methods of applying annual or monthly PRMs to achieve a 0.1 LOLE. Although Astrape did not present its stress tests as proposals, the CAISO has some concerns with them if they will be used to inform PRM levels. In its Stress Test 3, Astrape increases the single annual PRM until the annual LOLE equals 0.1. As noted in the Report, increasing the September PRM would require resources beyond the annual resource portfolio², and likely, resources beyond the resource portfolio planned for in the Integrated Resource Planning proceeding. As a result, increasing the September PRM could require additional resource buildout or import contracts, which would likely be infeasible in the resource adequacy timeframe.

A single annual PRM approach presents significant challenges. This approach could (1) increase annual reliability risk above 0.1 LOLE if the September PRM is used for the year and require reliance on non-resource adequacy resources to maintain reliability targets, or (2) require additional resources beyond the annual resource portfolio if the annual PRM is set greater than the peak month PRM, which may be infeasible. The Commission should not adopt a single PRM approach as default.

2. The Commission Should Not Adopt a Two PRM Approach or NRDC’s Approach as a Default until More Concrete LOLE Study Data is Available.

Astrape and Natural Resources Defense Council (NRDC) presented options to establish two or potentially more PRMs as alternatives to a single PRM approach. Astrape’s Stress Test 2 keeps the September PRM but applies a higher July or August PRM to all other months. Although Astrape states this approach could get closer to 0.1 LOLE across the year, using two PRMs requires subjective assumptions about how to allocate LOLE risk across the year. Under the two PRM approach, the PRM applied to all other months will overestimate or underestimate each monthly PRM need. Given the monthly construct of the current resource adequacy portfolio, the distribution of loss of load risk across months will be different than the results of the annual LOLE study. This increases the risk that the aggregate annual LOLE could exceed 0.1.

² Report, p. 124.

NRDC proposes the Commission set the PRM in any month with reliability risk such that the annual resource portfolio must be shown by LSEs in each of these months. NRDC proposes to apply a generic PRM to months with no reliability risk. NRDC also proposes that Energy Division retain discretion to limit PRM levels if, for example, there are insufficient resources to meet monthly requirements. Like Astrape's Stress Test 2, NRDC's approach requires assumptions about how to allocate LOLE across months, which as noted above could increase the risk that the aggregate annual LOLE will exceed 0.1.

Approaches such as Astrape's Stress Test 2 or NRDC's proposal use two (or potentially more than two) PRMs across the year to meet a 0.1 LOLE and require subjective assumptions about how to allocate LOLE risk across months. The Commission should not adopt these approaches as a default until more concrete LOLE study data is available for parties to assess whether these approaches can support reliable outcomes.

3. As a Default Approach, the Commission Should Set Monthly PRMs to Capture Reliability Needs Across the Year Precisely

As a default approach, the Commission should set monthly PRMs to capture reliability needs across the year precisely and avoid the shortcomings of the single annual PRM and two PRM approaches. The CAISO also suggests the Commission (1) re-evaluate PRM proposals when more concrete LOLE study data is available for parties to understand whether approaches other than a monthly PRM can support reliable outcomes, and (2) commit to regular analysis of the shown resource adequacy portfolios to understand whether the aggregate portfolios (shown in the 12 different months) under the PRM methodology ultimately adopted, meet a 1-in-10 standard. For example, the Commission can further analyze NRDC's proposal which could be a middle ground between the single annual PRM and twelve PRM approaches. Without the results of a refreshed LOLE study and understanding of the differences between monthly PRMs, however, it is difficult for parties to assess the viability of NRDC's proposal.

B. Resource Counting for Wind and Solar

1. The CAISO Did Not Find Significant Differences between PG&E and MRP Exceedance Benchmark Calculations

In D.22-06-050, the Commission directed parties to develop further the exceedance methodology proposed by Pacific Gas and Electric Company (PG&E) in Resource Adequacy Reform Track Phase 1. PG&E, MRP, and the Public Advocates Office at the California Public Utilities Commission (Cal Advocates) propose to determine exceedance levels by benchmarking against production on high load days. PG&E proposes to benchmark exceedance levels to average wind and solar production on the top five highest load days each month across six years of data. MRP proposes to use the top five percent of load days each month, rather than the top five days, to derive the exceedance benchmark. Cal Advocates uses PG&E's benchmark.

The CAISO compared the MRP and PG&E benchmarks for summer months using 2019 to 2022 data, and it did not find significant differences between the two benchmarks. In general, PG&E's benchmark is slightly more conservative than MRP's benchmark for solar and wind in August, but both approaches generally support about an 80% exceedance level for solar and 75% exceedance level for wind in summer months, if benchmarks are covered by the exceedance level in all hours. NRDC proposes that the Commission base wind and solar counting on the simple average of high load day profiles (top 2.5% of load days each month across years) rather than using an exceedance methodology. Based on CAISO's analysis, NRDC's high load day approach also supports about an 80% exceedance level for solar in summer months.

Figure 1 compares MRP's benchmark (top five percent of high load days), PG&E's benchmark (top five days), and NRDC's proposal (simple average of top 2.5% of days across all years) using 2019-2022 data. Figure 1 shows that MRP and PG&E benchmarks largely trend together across months, while NRDC's approach is more conservative especially in midday hours in June and July. MRP's and PG&E's approaches support about an 80% exceedance level for solar across all months, if benchmarks are covered in all hours. NRDC's proposal also aligns with about 80% exceedance levels in several hours in summer months. Figure 2 and Figure 3 provide the same comparison among proposals for NP15 and SP15 wind. Although there is more discrepancy between MRP's and PG&E's wind

benchmarks in some hours, both approaches support about a 75% exceedance level across summer months.

Figure 1: Solar counting proposal comparisons (2019-2022 data)

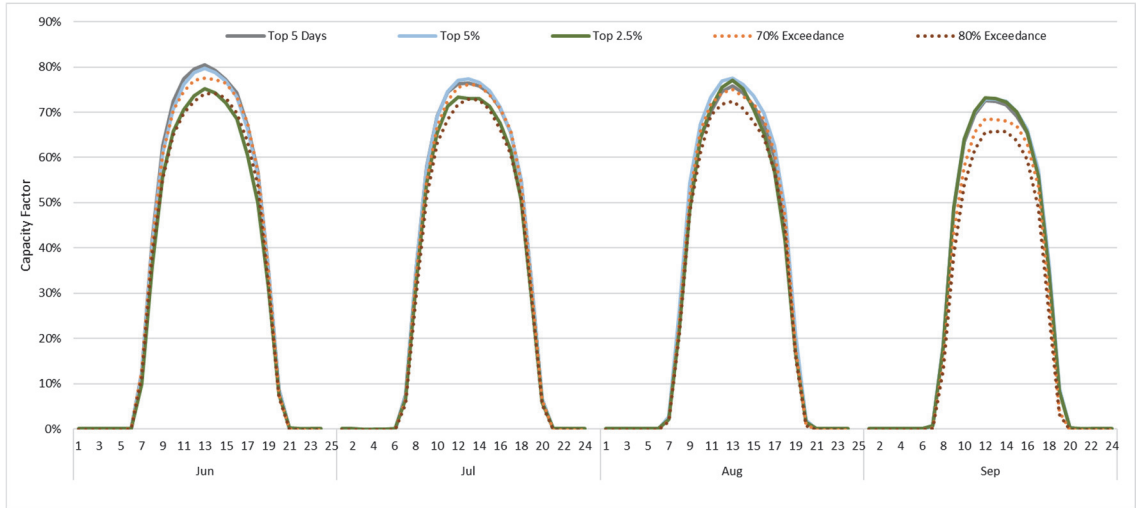


Figure 2: NP15 wind counting proposal comparisons (2019-2022 data)

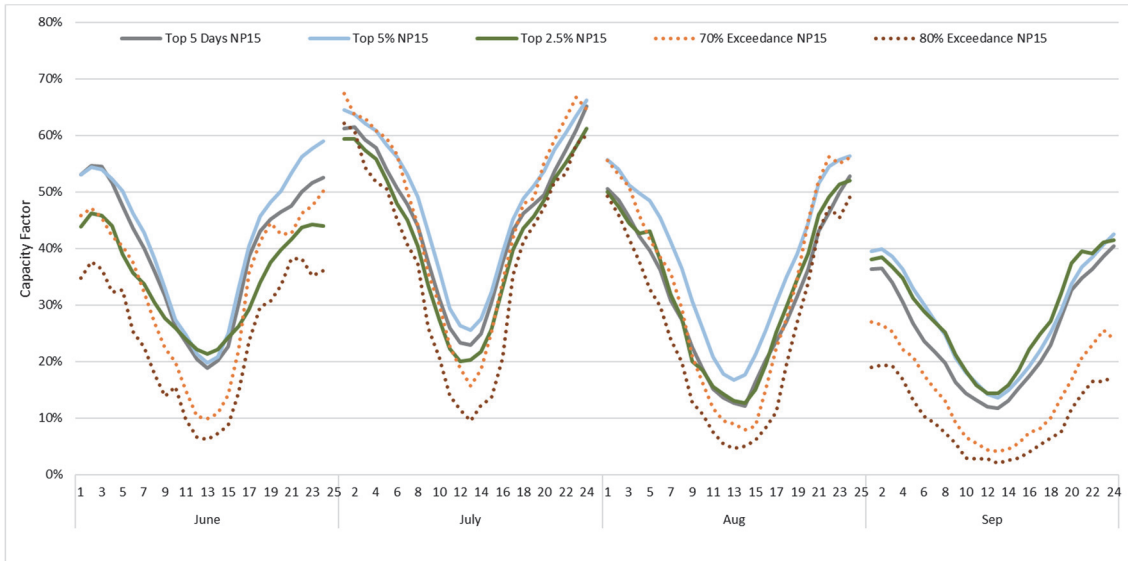
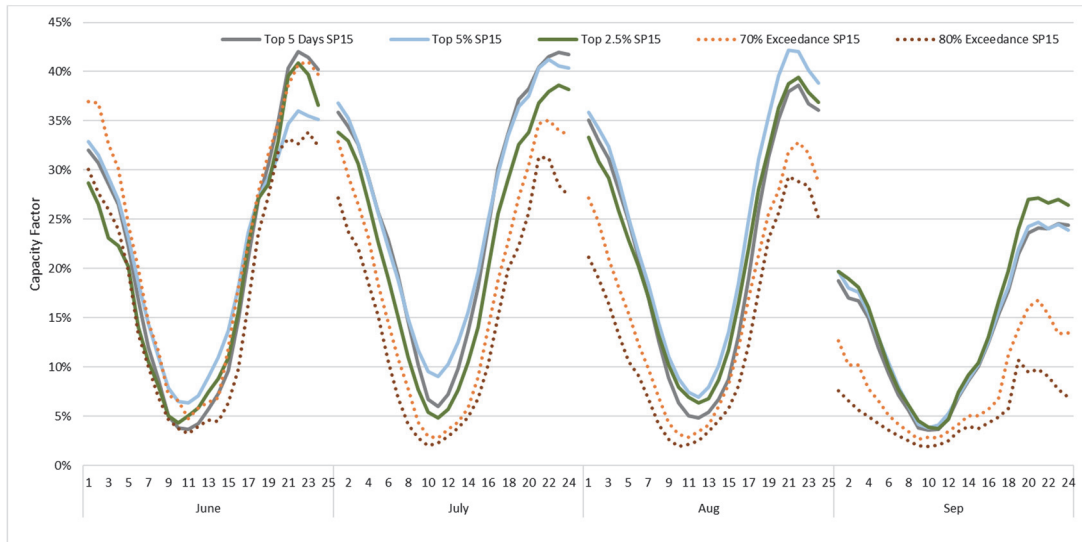


Figure 3: SP15 wind counting proposal comparisons (2019-2022 data)



2. The Commission Should Adopt MRP’s Exceedance Selection Methodology Which Better Ensures All Benchmark Hours Are Covered by the Exceedance Level

Although MRP’s and PG&E’s benchmarks are not significantly different, the two methodologies differ in how the exceedance level is selected based on the benchmark. PG&E proposes to “(s)elect the exceedance level that results in minor differences between that level and the high-load day profile in loss of load hours, while also ensuring simplicity.”³ Using 2015-2020 data, this methodology results in 70% exceedance in summer months and 50% exceedance in winter months, for both solar and wind. MRP selects the lowest exceedance level that had near-zero over counting compared to the benchmark.⁴ Using 2015-2020 data, MRP’s approach results in 80% summer exceedance for solar, 60% winter exceedance for solar, 75% summer exceedance for wind, and 50-62% winter exceedance for wind. Despite similar benchmarks, PG&E’s and MRP’s different exceedance selection methodologies result in very different exceedance levels.

The Commission should adopt MRP's exceedance selection methodology because it better ensures that all benchmark hours are covered by the exceedance level, not just hours with potential loss of load. As the storage fleet grows, it will be increasingly important to ensure the resource adequacy fleet provides sufficient energy to charge storage resources in

³ Report, p. 27.

⁴ Report, Figure 63, p. 159.

off-peak hours to meet demand in peak hours. MRP's exceedance selection methodology for wind and solar focuses on production in all hours, not just production at peak or net peak, and therefore it is more comprehensive and more effective given expected needs.

3. More Conservative Exceedance Approaches Better Account for Reliability Needs

The CAISO's analysis presented on October 6 showed that more conservative exceedance approaches better maintained reliability needs. Further, the analysis shows that 80%, and even 90%, exceedance levels could overstate actual wind and solar production on some stressed system days.⁵ First, the CAISO observed very low renewable production on operationally challenging days such as August 14 and 15, 2020 and September 8 and 9, 2022. Higher exceedance levels can better ensure coverage of renewable production on such stressed days. Higher exceedance levels can also better account for the drop in solar production in peak hours during the month of August and across evening hours as the sun sets. Additionally, if exceedance values are based on forecast or production data with curtailments, more conservative counting can better account for actual production when resources are subject to curtailments. Lastly, although lower exceedance levels will require higher PRM levels to meet reliability targets, establishing the PRM is complicated and may be adjusted to consider other factors, dampening the direct relationship between PRM and exceedance values. For example, the Commission may face regulatory challenges to set higher PRM levels.

C. Resource Counting for Co-located Resources

In the August 23 workshop, the CAISO raised issues with allowing energy only (EO) resources to count towards meeting storage charging requirements under Slice of Day.⁶ The CAISO stressed that only fully deliverable resources (FCDS), the deliverable part of a resource (PCDS), and interim deliverable resources (IDS) can provide resource adequacy capacity. EO resources cannot be shown as resource adequacy capacity to serve load or to charge storage resources across the transmission system. Transmission deliverability must

⁵ Report, pp. 51-53.

⁶ CAISO August 23 presentation.

continue to be enforced for any resource that uses the grid for delivery. This paradigm should not change under Slice of Day.

However, production from a co-located EO VER at the same point of interconnection (POI) does not flow across the transmission system to charge the co-located storage resource. In workshops, the CAISO presented advantages and challenges associated with allowing a co-located EO VER resource behind the same POI to count towards meeting co-located storage charging requirements under Slice of Day.⁷ The CAISO also noted there are only three co-located EO resources on the CAISO system today. The CAISO recognizes that allowing a co-located EO VER to count towards storage charging would provide comparable treatment to hybrid resources under a single market ID. However, EO resources cannot be shown as resource adequacy and thus would not be subject to CAISO's resource adequacy rules such as must-offer and substitution obligations.

In PG&E's August 23 presentation, PG&E proposed that if the Commission allows co-located EO VERs to count towards storage charging requirements under Slice of Day, then the EO VER resource production in excess of what is used to charge the co-located storage resource should not be eligible to count towards meeting resource adequacy requirements.⁸ The CAISO supports this recommendation.

D. UCAP-light

The Report requests parties to opine on the merits of pursuing Unforced Capacity Evaluation (UCAP)-light versus developing a more comprehensive UCAP methodology.⁹ The CAISO continues to support accounting for resource ambient de-rates directly in resource counting values. However, the CAISO supports further exploration of a more comprehensive application of UCAP to account for other types of forced outages in resource counting, not just ambient de-rates. The CAISO noted in workshops that its public outage data on resource ambient de-rates may be incomplete because resources may submit larger overlapping outages that account for the ambient de-rate. Therefore, the CAISO's outage

⁷ CAISO 8/23 presentation, Slide 5

⁸ PG&E 8/23 presentation, Slide 12

⁹ Report, p. 92.

data is not the best data source for a limited application of UCAP that only accounts for ambient de-rates.

In D.22-06-050, the Commission deferred further consideration of a broad UCAP design to a future phase of the resource adequacy proceeding. The CAISO encourages the Commission to continue exploring a UCAP counting methodology to account for forced outages in resource counting.

E. CAISO Validation and Compliance

In the September 21 workshop, the CAISO presented a potential option to operationalize Slice of Day that could comport with the CAISO's existing resource adequacy processes and align with Slice of Day reforms. Under this option, the CAISO would use two or more hourly values from the Commission's Slice of Day framework in different CAISO resource adequacy processes. For example, one value could be the peak hour showing values used for system resource adequacy assessments. Another value could be non-zero Qualifying Capacity (QC) and showing values from a different hour to calculate the percent of each resource shown in order to dispatch resources in local assessments. The CAISO noted, however, that this option would require CAISO system changes, and further discussion in a CAISO stakeholder process to determine what values should set must-offer and outage substitution obligations. The CAISO also noted the timing and feasibility of potential changes is subject to further scoping and assessment.

In workshops, Silicon Valley Clean Energy (SVCE) and MRP also noted that QC and showing values that Energy Division staff and LSEs submit to the CAISO have implications for downstream processes like Maximum Import Capability (MIC) and system assessments.¹⁰ SVCE and MRP raise valid questions. These and other issues regarding how the CAISO will operationalize Slice of Day should be vetted in more detail in a CAISO stakeholder process.

To operationalize Slice of Day, SCE proposes the CAISO retain the status quo and continue to use today's QC values in CAISO processes until the CAISO determines it will adopt a different framework. This means that entities would continue to show ELCC values for wind and solar resources to the CAISO instead of using exceedance values established under Slice of Day. Although this option would not require CAISO system or process

¹⁰ Report, pp. 145-146.

changes, the CAISO recognizes that different counting methodologies between the CAISO and the Commission resource adequacy programs could result in discrepancies between CAISO and Commission compliance, where an LSE could pass CAISO compliance and not Commission compliance or vice versa. As a result, LSEs may have to procure to meet two different compliance frameworks. The CAISO will continue to work with parties on CAISO compliance issues in a forthcoming CAISO stakeholder process.

F. Flexible Resource Adequacy

In the September 21 workshop, Energy Division staff presented pros and cons of removing the flexible capacity obligations in line with Slice of Day implementation.¹¹ The CAISO agrees with Energy Division that flexible capacity requirements are part of the CAISO tariff, and ultimately a CAISO stakeholder process will be required to eliminate these requirements. As suggested by parties in the September 21 workshop, the CAISO will continue to coordinate with Energy Division staff on potential changes to the flexible resource adequacy capacity design.

III. Conclusion

The CAISO appreciates the opportunity to provide comments on the Report.

Respectfully submitted

By: /s/ Marissa Nava

Roger E. Collanton

General Counsel

Andrew Ulmer

Assistant General Counsel

Marissa Nava

Counsel

California Independent System

Operator Corporation

250 Outcropping Way

Folsom, CA 95630

Tel: 916-963-0521

Fax: 916-608-7222

Email: mnava@caiso.com

Date: December 1, 2022

¹¹ Energy Division 9/21 presentation