

APPENDIX A



California Public Utilities Commission

February 7, 2020

Energy Division Proposals for Proceeding R.19-11-009

Proposal A: Revising Maximum Cumulative Capacity Buckets

Proposal A: Revising Maximum Cumulative Capacity Buckets

Table of Contents

| | |
|--|---|
| I. Background | 2 |
| II. Problem Statement and Analysis | 4 |
| Option 1: Incorporate 2016-2018 Load Duration Curves | 4 |
| Common Components of Options 2 through 4..... | 5 |
| Option 2: Incorporate 2016-2018 Load Duration Curves and Account for Intermittent Generators .. | 5 |
| Options 3a and 3b: Incorporate 2016-2018 Load Duration Curves and Cap the DR Bucket | 6 |
| Options 4a and 4b: Incorporate 2016-2018 Load Duration Curves, Cap the DR Bucket, and Account for Intermittent Generators..... | 8 |
| III. Recommendation..... | 9 |

I. Background

During the Rulemaking (R.)04-04-003 Phase 2 workshops held in April 2005, Mirant advocated that the Resource Adequacy (RA) program develop resource categories that would indicate the maximum amount of capacity Load Serving Entities (LSE) could rely on from various use-limited resources.¹ Following the issuance of Decision D.05-10-042, Energy Division issued a straw proposal² that included procurement percentage limits for various resource categories, based on historical load duration curves. Energy Division held a workshop to discuss these proposals in December 2005, and beginning with the 2006 Year Ahead compliance process, RA compliance templates identified four categories of resources (“buckets”)³ based on the minimum number of hours a resource would be available during the summer months.

The four resource categories were based on standard power products: Category 1 included resources that were available five days per week and four hours per day (5x4), Category 2 included resources that were available five days per week and eight hours per day (5x8), Category 3 included resources that were available six days per week and sixteen hours per day (6x16), and Category 4 included resources that had unlimited availability.⁴ The Commission also established minimum hours of availability for Use Limited Resources (ULR) in Category 1 under the assumption that these resources must operate for at least enough hours to cover the last 10% of peak load in each summer month.⁵ To determine the maximum cumulative capacity (MCC) for each bucket, Energy Division used the following general process:

1. Calculate the average load duration curve across the summer months for all three years
2. Identify the most restrictive bucket
3. Match hourly availability of the most restrictive bucket to a load value on the average load duration curve (e.g., Bucket 1 has 40 hours of availability, and the 40th highest load hour has a load value of X MW)
4. Subtract the matched hourly load value from the peak load
5. Set the difference equal to the MW that can be met by that bucket
6. Set the matched hourly load value as “peak load” (but do not remove any hours from the average load duration curve) and repeat steps 2-5 for the remaining buckets

¹ “Resource Adequacy Phase 2 Workshop Report,” June 10, 2005, p. 53, available at <http://docs.cpuc.ca.gov/PUBLISHED/REPORT/46914.PDF>.

² See “Energy Division Straw Proposal” at <https://www.cpuc.ca.gov/General.aspx?id=6442452687>.

³ The terms “category” and “bucket” are used interchangeably throughout this Proposal.

⁴ See Energy Division’s “Proposed Implementation of the Mirant Top Down Methodology as adopted in D.05-10-042” at 1 (ftp://ftp.cpuc.ca.gov/puc/hottopics/1energy/cpuc01211988-v3_endiv_straw_top-down_description.doc) and “Local Resource Adequacy Requirements Phase 1 Staff Report,” April 10, 2006, Appendix A at 4 (<http://docs.cpuc.ca.gov/Published/Graphics/55065.PDF>).

⁵ D.05-10-042 at 73-75. Also see “Local Resource Adequacy Requirements Phase 1 Staff Report,” April 10, 2006, Appendix A at 4 and “Workshop Report on Resource Adequacy Issues,” June 15, 2004 at 24-25 (http://docs.cpuc.ca.gov/word_pdf/REPORT/37456.pdf).

7. Calculate the MCC for each bucket as [sum(MW met by given bucket and all more restrictive buckets) / peak load of the entire load duration curve]

The buckets adopted in 2005, including the cumulative capacity from preceding buckets, are provided in the table below.

MAXIMUM CUMULATIVE CAPACITY BUCKETS ADOPTED IN 2005

| Category | Monthly Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|---|--|
| 1 | Greater than or equal to the Use Limited Resource (ULR) monthly hours. ULR hours for May through September are, respectively: 30, 40, 40, 60, and 40. | 13.3% |
| 2 | At least 160 hours | 18.6% |
| 3 | At least 384 hours | 30.1% |
| 4 | Unrestricted | 100% |

The MCC buckets were last updated in 2012. Decision D.11-10-003 adopted a fifth bucket for all demand response (DR) resources and required the Commission to finalize implementation details ahead of the 2013 program year.⁶ Decision D.12-06-025 adopted what was known as the “default” Energy Division proposal in R.11-10-023, which revised the percentages in the MCC buckets based on 2009-2011 load duration curves and implemented the DR bucket. However, D.12-06-025 required Energy Division to modify the DR bucket in the default proposal with the understanding that DR programs were available for at least 16 hours per month.⁷ In its 2013 RA Filing Guide, Energy Division implemented modified MCC buckets, including a DR bucket that assumed all DR resources were available for at least 24 hours per month. These revised MCC buckets, which remain in place for program year 2020, are presented in the table below.

CURRENT MAXIMUM CUMULATIVE CAPACITY BUCKETS ADOPTED PURSUANT TO D.12-06-025

| Category | Monthly Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|---|--|
| 1 | Greater than or equal to the Use Limited Resource (ULR) monthly hours. ULR hours for May through September are, respectively: 30, 40, 40, 60, and 40. | 16.2% |
| 2 | At least 160 hours | 21.7% |
| 3 | At least 384 hours | 33.8% |
| 4 | Unrestricted | 100% |
| DR | No limit, but available at least 24 hours per month | 100% |

⁶ D.11-10-003, Ordering Paragraph (OP) 1(b), available at http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/145022.PDF.

⁷ D.12-06-025, Finding of Fact (FOF) 6 and Conclusion of Law (COL) 6, available at http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/169718.PDF.

II. Problem Statement and Analysis

The January 22, 2020 Scoping Ruling in proceeding R.19-11-009 identified updating the MCC buckets to address increasing reliance on use-limited resources to meet reliability as a priority, and staff agrees that it is appropriate to incorporate more recent load duration curves, given significant increased penetration of intermittent and use-limited resources since the last update. In addition, while the purpose of the RA program is to ensure that there is sufficient electricity to meet the state's needs, the current buckets enable LSEs to meet as much as 100% of their RA requirement with DR and/or storage resources, neither of which generate electricity. Clearly, all LSEs will need some amount of generating resources in their portfolio, since a portfolio made up entirely of DR and storage would not be able to meet an LSE's yearly energy needs. With regard to DR specifically, a substantial amount of currently available capacity is comprised of emergency programs, which do not consistently reduce load each month.

It is also important to clarify several parameters for classifying a resource as "available" to provide RA capacity. First, "available" means "able to operate." A resource that can only operate for four hours per day cannot be considered a Category 4 resource simply because it bids 24 hours per day at prices that all but ensure it will not be called upon to operate. Rather, it should fall in the category that reflects the physical limitations of the resource. Similarly, a resource is not truly available to provide RA capacity for an entire month if it is only available for a portion of that month. For example, a resource that can meet the minimum ULR hours – but only in the first two weeks of the month – should not qualify as an RA resource. In addition, dispatchable resources that provide RA capacity should be available during the RA planning hours, which are currently hour ending 17 to hour ending 21 (4 PM to 9 PM) for all months.⁸ Finally, if a resource is only dispatched rarely or is not dispatched at all (for example, some import or DR resources), this calls into question how the resource could be considered "available" to meet 1-in-2 loads, consistent with the RA program.

The following subsections present several options for revising the MCC buckets. Staff's recommendation is provided in Section III.⁹

Option 1: Incorporate 2016-2018 Load Duration Curves

Option 1 simply updates the existing MCC buckets using 2016-2018 load duration curves for the months of May through September making no changes to currently adopted availability categories.

⁸ D.18-06-030, OP 13.

OPTION 1: UPDATE LOAD DURATION CURVES

| Category | Monthly Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|---|--|
| 1 | Greater than or equal to the Use Limited Resource (ULR) monthly hours. ULR hours for May through September are, respectively: 30, 40, 40, 60, and 40. | 16.0% |
| 2 | At least 160 hours | 22.2% |
| 3 | At least 384 hours | 34.8% |
| 4 | Unrestricted | 100% |
| DR | No limit, but available at least 24 hours per month | 100% |

Common Components of Options 2 through 4

Options 2 through 4 incorporate the updated load data in Option 1 and have several additional components in common. First, each proposes to simplify the ULR hours in Category 1 by establishing 40 hours as the minimum availability for all summer months (May through September). To arrive at this number, Energy Division used the updated 2016-2018 load duration curves to re-calculate the ULR minimum hours in each summer month and determined that the minimum hours are 31 for May, 36 for June, 47 for July, 50 for August, and 18 for September. Whereas these hours correspond to the top 10% of average peak load in those months, 40 hours corresponds to 12%, 11%, 9%, 8%, and 14% of peak load in May through September, respectively. Staff believes that equalizing the minimum ULR hours at 40 across all five summer months will simplify requirements while ensuring limited resources could theoretically meet close to 10% of average load in July and August and over 10% of load in the remaining months (including September, which was the forecasted peak month in 2019 and 2020).

Second, Options 2 through 4 spread the minimum hourly availability in each bucket across a month by mapping the standard power products originally incorporated in each bucket (see Section I above) to certain days and hours of the week. This change clarifies that RA resources must be available throughout the month, not only during certain portions of the month. Finally, each option specifies that dispatchable RA resources must be available during the current availability assessment hours (4 PM to 9 PM) each day.¹⁰

Option 2: Incorporate 2016-2018 Load Duration Curves and Account for Intermittent Generators

Currently, intermittent solar and wind generators are counted in Category 4, even though they are not available at all times. Option 2 would keep solar and wind within Category 4 but acknowledge that a certain amount of resources must be truly able to generate at all times in order to serve load.

¹⁰ Note that the DR Category and Categories 1 through 3 only include dispatchable resources and that Category 4 includes both dispatchable and non-dispatchable (wind and solar) resources.

Otherwise, some LSEs could meet a substantial portion of their RA requirements with resources that are not always available to meet the net load peak (that is, the peak load after subtracting the output of non-dispatchable renewables from the load duration curve) during the RA planning hours. These LSEs would be leaning on other LSEs’ portfolios that have more resources with unlimited availability.

In Option 2, Staff calculated the buckets using average 2016-2018 load duration curves but set a minimum level of resources within Category 4 that must be available in all hours. Staff determined this level by re-calculating MCC bucket percentages using the average 2016-2018 net load (load minus solar and wind production) duration curve, which yielded an incremental Category 4 value of 56.1%. This implies that 56.1% of total capacity shown must come from resources that are available for all 24 hours in order to meet the peak load that remains after accounting for solar and wind production. (Put differently, non-dispatchable resources and resources in Categories 1-3 can account for at most 43.9% of shown capacity.) Staff incorporated this requirement into Category 4 in Option 2.

OPTION 2: MINIMUM LEVEL OF UNLIMITED AVAILABILITY RESOURCES

| Category | Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|--|--|
| 1 | Monday – Friday, 4 consecutive hours between 4 PM and 9 PM, and at least 40 hours per month from May – September | 16.0% |
| 2 | Every Monday – Friday, 8 consecutive hours that include 4 PM – 9 PM | 22.2% |
| 3 | Every Monday – Saturday, 16 consecutive hours that include 4 PM – 9 PM | 34.8% |
| 4 | Every day of the month. Dispatchable resources must be available all 24 hours. | 100% (at least 56.1% available all 24 hours) |
| DR | No limit, but available at least 24 hours per month during the hours 4 PM – 9 PM | 100% |

Options 3a and 3b: Incorporate 2016-2018 Load Duration Curves and Cap the DR Bucket

The current MCC buckets leave DR unrestricted and assume that DR resources are available at least 24 hours per month. However, this level of dispatch appears unreasonable given current IOU tariff requirements and the current 30-hour-per-year required dispatch provisions for DRAM resources. Making assumptions about availability is challenging given that annual dispatches are generally well below maximum tariff provisions and a large percentage of DR capacity is comprised of emergency programs which can only be dispatched when there is a grid reliability issue.

Options 3a and 3b below address this concern by creating a discrete “DR” bucket that precedes the other MCC buckets. Put differently, staff treated DR as the “most limited” bucket in the procedure outlined in Section I above instead of treating DR as an unrestricted bucket (which is the current approach). Option 3a, incorporates DR into the cumulative bucket structure as the first bucket and assumes that the dispatch of all DR programs will be 30 hours per year, or 6 hours per month for the five

summer months, consistent with DRAM requirements. Option 3b incorporates DR in the same way but sets DR dispatch at 12 hours, assuming that DR resources would on average be dispatched 12 hours per month. Note that “dispatch” is different from “availability” in that staff assumes DR resources are available according to their contract or tariff provisions but are generally dispatched far less (assumed to be either 6 hours per month or 12 hours per month in Options 3a and 3b). Furthermore, any resource must be able to operate for four hours on three consecutive days in order to qualify as RA capacity.¹¹

OPTION 3A: ASSUMING SIX HOUR PER MONTH DR DISPATCH

| Category | Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|--|--|
| DR | Varies by contract or tariff provisions, but must be available during the hours 4 PM – 9 PM | 3.2% |
| 1 | Monday – Friday, 4 consecutive hours between 4 PM and 9 PM, and at least 40 hours per month from May – September | 16.0% |
| 2 | Every Monday – Friday, 8 consecutive hours that include 4 PM – 9 PM | 22.2% |
| 3 | Every Monday – Saturday, 16 consecutive hours that include 4 PM – 9 PM | 34.8% |
| 4 | Every day of the month. Dispatchable resources must be available all 24 hours. | 100% |

OPTION 3B: ASSUMING TWELVE HOUR PER MONTH DR DISPATCH

| Category | Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|--|--|
| DR | Varies by contract or tariff provisions, but must be available during the hours 4 PM – 9 PM | 5.3% |
| 1 | Monday – Friday, 4 consecutive hours between 4 PM and 9 PM, and at least 40 hours per month from May – September | 16.0% |
| 2 | Every Monday – Friday, 8 consecutive hours that include 4 PM – 9 PM | 22.2% |
| 3 | Every Monday – Saturday, 16 consecutive hours that include 4 PM – 9 PM | 34.8% |
| 4 | Every day of the month. Dispatchable resources must be available all 24 hours. | 100% |

¹¹ D.04-10-035 at COL 17.

Options 4a and 4b: Incorporate 2016-2018 Load Duration Curves, Cap the DR Bucket, and Account for Intermittent Generators

Options 4a and 4b use the same DR assumptions as Options 3a and 3b, respectively, but they also incorporate minimum percentages for resources with unlimited availability using the net load duration curve.

OPTION 4A: MINIMUM LEVEL OF UNLIMITED AVAILABILITY RESOURCES AND ASSUMING SIX HOUR PER MONTH DR DISPATCH

| Category | Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|--|--|
| DR | Varies by contract or tariff provisions, but must be available during the hours 4 PM – 9 PM | 3.2% |
| 1 | Monday – Friday, 4 consecutive hours between 4 PM and 9 PM, and at least 40 hours per month from May – September | 16.0% |
| 2 | Every Monday – Friday, 8 consecutive hours that include 4 PM – 9 PM | 22.2% |
| 3 | Every Monday – Saturday, 16 consecutive hours that include 4 PM – 9 PM | 34.8% |
| 4 | Every day of the month. Dispatchable resources must be available all 24 hours. | 100% (at least 56.1% available all 24 hours) |

OPTION 4B: MINIMUM LEVEL OF UNLIMITED AVAILABILITY RESOURCES AND ASSUMING TWELVE HOUR PER MONTH DR DISPATCH

| Category | Availability | Maximum Cumulative Capacity for Bucket and Buckets Above |
|----------|--|--|
| DR | Varies by contract or tariff provisions, but must be available during the hours 4 PM – 9 PM | 5.3% |
| 1 | Monday – Friday, 4 consecutive hours between 4 PM and 9 PM, and at least 40 hours per month from May – September | 16.0% |
| 2 | Every Monday – Friday, 8 consecutive hours that include 4 PM – 9 PM | 22.2% |
| 3 | Every Monday – Saturday, 16 consecutive hours that include 4 PM – 9 PM | 34.8% |
| 4 | Every day of the month. Dispatchable resources must be available all 24 hours. | 100% (at least 56.1% available all 24 hours) |

III. Recommendation

Energy Division staff recommends Option 4b, which incorporates average 2016-2018 load duration curves, assumes DR will be dispatched twelve hours per month, requires that ULRs be available at least 40 hours in each summer month, spreads availability for resources in Categories 2 through 4 across an entire month, and requires that at least 56.1% of RA resources be available for all 24 hours during each day of the month. Staff invites parties' feedback on all aspects of this proposal. Staff recognizes that these limits – and in particular the limits for DR – are based on past performance and could change over time. Consequently, staff proposes to revisit the MCC structure regularly to readjust the percentages in each bucket based on assessments of the deployment and dispatch of the various categories of ULRs.

(End of Appendix A)