CALIFORNIA PUBLIC UTILITIES COMMISSION

An Assessment of Capacity Under Contract

An Energy Division Draft Staff Working Paper

December 22, 2016

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List of Abbreviations

AAEE	Additional Achievable Energy Efficiency
CAISO	California Independent System Operator
CEC	California Energy Commission
CPUC	California Public Utilities Commission
D.	Decision
EFC	Effective Flexible Capacity
IEPR	Integrated Energy Policy Report
IOU	Investor Owned Utility
LCR	Local Capacity Requirement
LSEs	Load Serving Entities
LTPP	Long Term Procurement Plan
NQC	Net Qualifying Capacity
NYO	Not Yet Online
RA	Resource Adequacy
Staff	Energy Division Staff
UOG	Utility Owned Generation

Introduction and Summary

In October 2014, California Public Utilities Commission (CPUC) Energy Division Staff ("Staff") released the *Joint Reliability Plan Track One Staff Report*[1] examining existing forward procurement practices among CPUC jurisdictional Load Serving Entities (LSEs) that are part of the California Independent System Operator (CAISO). The report examined existing capacity contracts as of May 2014, looking ten years out, from January 2014 through December 2024.

The *Joint Reliability Plan Track One Staff Report* found that system capacity for CPUC jurisdictional LSEs was nearly 90 percent contracted two years forward and that flexible capacity was over contracted two years forward. It did not examine local capacity.

This report serves as a follow-up to the 2014 report. It assesses the capacity under contract to meet Resource Adequacy (RA) requirements[2] and examines the types of resources that are under contract to meet those requirements, looking at forward procurement practices as of October 2015, from January 2016 through December 2026. While this information is no longer current, it provides general information about forward contracting practices and serves as the basis for further information gathering that Energy Division intends to undertake annually.

Staff conducted this long-term assessment of the capacity under contract to CPUC jurisdictional LSEs (as of October 2015) from January 2016 through December 2025 comparing the amounts of capacity under contract to the system, local and flexible need.

As expected, LSEs fulfilled their RA requirements for system, local, and flexible capacity in each RA compliance year. As seen in prior assessments, the level of forward contracted capacity declines outside of the RA compliance year. The amount of system and flexible capacity contracted declines incrementally year over year through 2025. Local capacity also declines in the years immediately following the RA compliance year (2017 and 2018) with some areas remaining relatively stable or experiencing slight declines in the years after.

Throughout the ten year period examined, the system demand forecast remains very stable. Even with the incremental yearly decline in forward contracted system capacity, 44 percent or more of the forecast need is under contract through 2025. Almost all of the forecast 2017 local capacity need in each local area was contracted as fall 2015. Assuming flexible needs remained constant (which is unlikely) approximately 60 percent of the 2016 RA flexibility requirement could be met through 2025.

As mentioned previously, this report does not represent the current state of procurement, but provides a snapshot of forward procurement practices as of October 2015, and provides the basis for further analysis of forward contracting practices.

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[1] http://cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=9107

[2] The Resource Adequacy (RA) Program requires that LSEs procure sufficient capacity to maintain reliability at forecast load and make that capacity available to the CAISO. Further explanation can be found in the RA Guide: http://cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6454

Methodology

Data Collection

Following the 2014 *Joint Reliability Plan Track One Staff Report*, Energy Division held a workshop in April 2015 to discuss the data response Excel template that was sent out with the data request.[3] This data request followed the May 2014 request utilized in the *Joint Reliability Plan Track One Staff Report.* At this workshop the LSEs discussed the layout of the data response Excel template. During the workshop, they requested that the data request template be shorter and simpler than the one from 2014. The data request template was revised incorporating party feedback.

Staff created a contracts database to analyze current forward procurement practices in California by examining resources under contract to CPUC jurisdictional LSEs that are part of the CAISO. Staff populated the database with data received through a data request sent to twenty-one LSEs.[4] The data request obtained information for all resources including conventional and renewable generation, demand response and storage resources. For each month starting in January 2016 through December 2025, Staff collected information on the system, local, and flexible capacity (MW) under contract for each resource.

LSEs provided information in two separate spreadsheets: one for "online"[5] resources and one for "not-yet-online"[6] resources.

Timeframe and Comment

LSEs received a 30-day window to respond to the data request sent out in October 2015. Additionally, staff encouraged LSEs to submit notes on the data request process in order to improve subsequent data requests. Some but not all of the LSEs responded to the optional request for comment on the data collection process. Staff plans to improve the process in future years based on LSE input.

Data Validation

The contract database was initially validated against the CAISO's 2016 Net Qualifying Capacity (NQC) List[7] and the January 15, 2016 CAISO Master Control Area Generating Capability List.[8] The Master CAISO

[3] The data request and Excel template can be found in Appendix 1.
[4] These LSEs include the following: 3 Phases Renewables, Commerce Energy, Commercial Energy of Montana, Constellation New Energy, Inc., Calpine Power America-CA, LLC, Direct Energy Business, LLC, EDF Industrial Power Services-CA, LLC, Glacial Energy of California, Gexa Energy California, LLC, Liberty Power Holdings, LLC, Marin Energy Authority, Noble Americas Energy Solutions, LLC, Pacific Gas & Electric Company, Pilot Power Group, Inc., Southern California Edison, San Diego Gas & Electric Company, Shell Energy North America, Tiger Natural Gas, Inc., Sonoma Clean Power, The Regents of the University of California, and Lancaster Choice Energy.
[5] "Online" refers to facilities that have achieved commercial operation.
[6] "Not-yet-online" (NYO) refers to facilities with contracts that are expected to be built, have not yet been built, are in the process of being built, or have already been built but have not yet achieved commercial operation.
[7] http://www.elabs7.com/c.html?ufl=7&rtr=on&s=lgl3,1998c,7k2,8gcf,l8p0,b589,diqv

Control Area Generating Capability List includes all the active generating resources in the CAISO balancing authority area. The CAISO's NQC List includes all resources that can be used for resource adequacy. NQC reflects reductions to rated capacity based on: (1) testing and verification; (2) application of performance criteria; and (3) deliverability restrictions. The NQC determination is made based on rules adopted by the RA program.[9] LSEs fulfill their RA requirements through the purchase of capacity from resources on the NQC list. In the data request, staff requested the amounts of capacity under contract as a proxy for the NQC amount. In validating the contracts database, staff took various steps to address deficiencies found in the data. An explanation of these steps can be found in Appendix 2.

Utility Owned Generation Resources Included in Analysis

Utility-owned generation (UOG) is not technically contracted, but is included in this study in the calculations of contracted capacity since it is under investor-owned utility (IOU) control. Thus, throughout this analysis "contracted capacity" includes not only the capacity under contract but also the capacity that is UOG.

Once Through Cooling Requirements

A number of old, steam generators have or will retire to comply with the State Water Board's Statewide Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling. Combined-cycle facilities, which are more efficient and release fewer greenhouse gases per KWh produced, and combustion turbine units are expected to replace these retiring steam units.

Methodology for Analysis of System Capacity

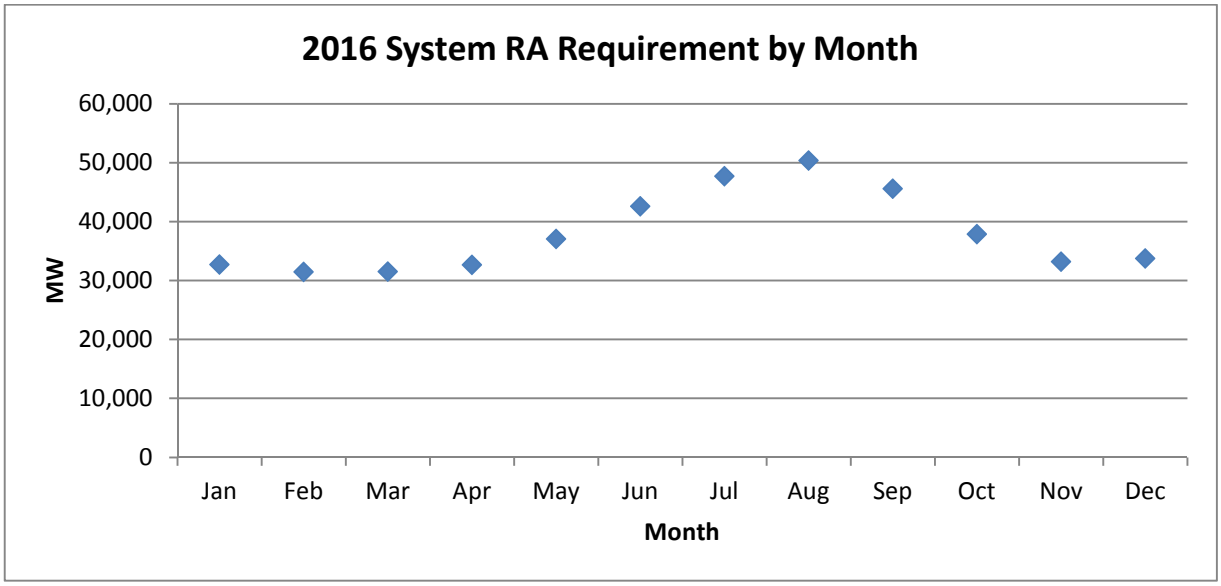
The CPUC implements system RA requirements mandated under the RA program to ensure that CPUC jurisdictional LSEs within the CAISO have sufficient system capacity to meet their peak load with a 15 percent reserve margin.

To analyze the system capacity under contract, staff compared the total amount of system capacity under contract from January 2016 through December 2025 to both the forecast supply as well as the forecast need, as described below. Staff examined system capacity in the month of August because this is historically the month of system peak need and, thus, the month with the highest system RA requirement (see Figure 1). The contracts database also includes the year before this 10-year period (2015) to better illustrate the RA requirement.

[8] The CAISO continuously updates this list, found here: http://www.caiso.com/Documents/Master%20control%20area%20generating%20capability%20list/GenerationCapabilityListas-Mar10_2011.xls

[9] More information on the Resource Adequacy program can be found at www.cpuc.ca.gov/RA.

Figure 1 2016 Total System RA Requirement for CPUC Jurisdictional LSEs by Month including PRM



Staff adjusted the California Energy Commission's (CEC) California Energy Demand-IEPR 2016-2026,[10] Mid-Demand, Mid-Additional Achievable Energy Efficiency (AAEE) Savings, Net[11] Electricity CAISO Coincident Peak Demand Forecast[12] to establish a demand forecast representative of only the LSEs jurisdictional to the CPUC.[13] To calculate the adjustment factor staff examined the August load shares for all of the entities that serve load in California and summed the percentage of CAISO load share for only the LSEs that are jurisdictional to the CPUC.[14] CPUC-jurisdictional LSEs were expected to serve approximately 91.4 percent of the load for the CAISO balancing area in 2016. Staff assumed that this percentage would not change materially over time, and applied a downward adjustment factor of 8.6 percent (for non-CPUC jurisdictional entities) to the CEC forecast in all years in the analysis.

Staff obtained the system RA requirement for 2015 and 2016 from the RA program's year-ahead data. To forecast the system RA requirement and establish a forecast need for subsequent years, staff added a 15 percent planning reserve margin to the adjusted (representing only CPUC jurisdictional LSEs) CEC-IEPR demand forecast. This allowed staff to compare contracted capacity with forecasted future requirements.

[10] This 2016 forecast does not account for potential shifts in the timing of the utility peak as additional behind-the-meter PV is added to the utility distribution system. The CEC has stated that changes to the peak load model used to forecast long-term peak demand are expected to be included in the 2017 IEPR demand forecast. Report can be found at: http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN207439_20160115T152221_California_Energy_Demand_20162026_Revised_Electricity_Forecast.pdf

[11] 1-in-2 weather year.

[12] http://docketpublic.energy.ca.gov/PublicDocuments/15-IEPR-03/TN209989_20160127T094920_LSE_and_BA_Tables_Mid_Demand_Baseline__Mid_AAEE.xlsx

[13] The CEC forecast includes all LSEs in California, and therefore needed to be adjusted for this analysis.

[14] List of CPUC jurisdictional LSEs can be found by referencing Footnote #3.

Staff used the Long-Term Procurement Plan's (LTPP) Scenario Tool [15] to obtain a forecast of available supply resources. The forecast supply sums the capacity of supply-side resources using the existing or expected NQC of a resource for the month of August.

Methodology for Analysis of Local Capacity

The CAISO conducts local capacity technical analyses annually[16] using a 1-in-10 weather year[17] and an N-1-1 contingency, also known as a P3 Multiple Contingency.[18] Each study determines the amount of local capacity needed by the CAISO within all transmission constrained local areas to maintain a safe and reliable bulk electric grid. The CAISO's analysis is submitted into the RA proceeding annually and the Commission establishes the Local Capacity Requirements (LCR) in the annual RA decision in June. The LCRs are allocated to CPUC jurisdictional LSEs as the RA program local requirement for that year.

The CAISO's annual analyses identify the minimum local resource capacity required for each local area to meet established reliability criteria one year forward and also evaluates needs five years out as an indicator of what future LCRs may be. For this analysis, staff used the 2015 and 2016 CPUC LCRs and the forecast LCRs published in the 2017 Local Capacity Technical Analysis[19] and 2020 Long-Term Capacity Technical Study.[20]

There are ten local capacity areas in CAISO.[21] The local capacity requirement in some of these areas varies over time but remains relatively stable.[22] The CPUC RA program aggregates Humboldt, North Coast/North Bay, Sierra, Stockton, Greater Fresno, and Kern into "Other PG&E Areas." Additionally, within each local area there are sub-areas that have their own unique needs. Staff did not study the needs of the sub-areas within local areas and concentrated instead on an analysis of capacity contracted and whether it meets the RA requirement for an aggregation of the Northern California area and an aggregation of the Southern California area.

Staff compared the amount of local capacity in the contracts database for 2017 and 2020 to the RA requirement forecast for those years (based on the results from the 2017 and 2020 Local Capacity Technical Studies). This forecast is an indicator of what the CPUC mandated local RA requirement may be in those years.

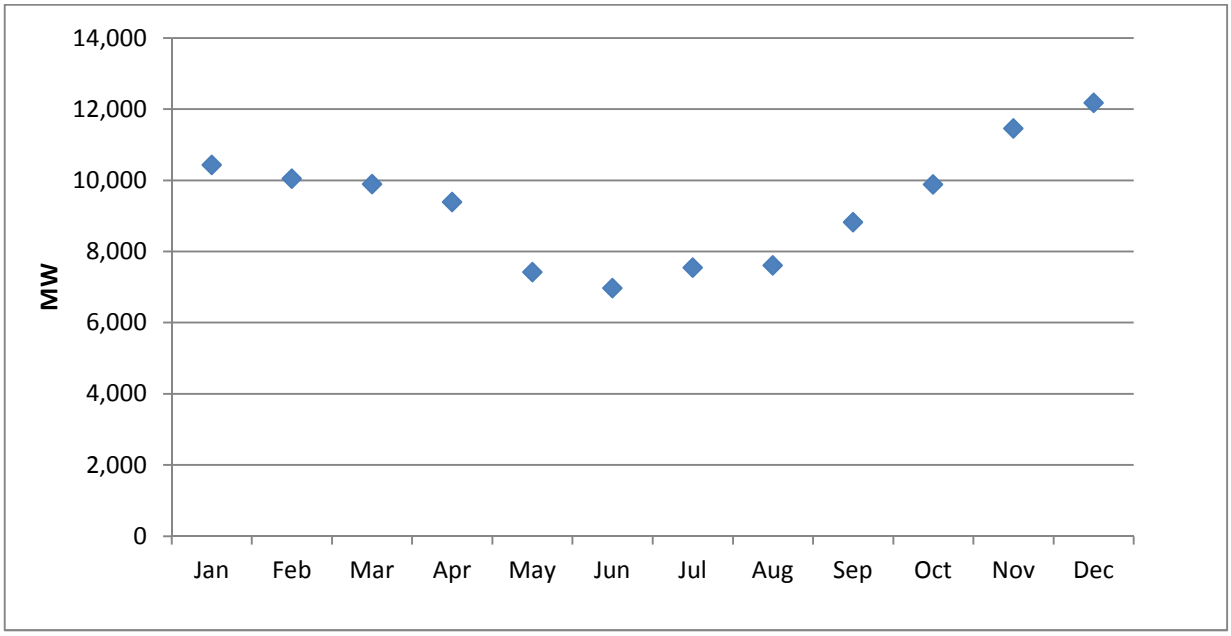
Methodology for Analysis of Flexible Capacity

[15] http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6618.
[16] https://www.caiso.com/Documents/Final2016LocalCapacityTechnicalReportApr302015.pdf.
[17] Weather year likely to occur one day in ten years.
[18] The loss of a generator, transmission circuit, transformer, shunt device, or a single pole of a DC line occurring after the loss of a generator unit followed by system adjustments, http://www.nerc.com/files/TPL-001-4.pdf.
[19] http://www.caiso.com/Documents/Draft2017LocalCapacityTechnicalReportApr112016.pdf.
[20] https://www.caiso.com/Documents/Final2020Long-TermLocalCapacityTechincalReportApr302015.pdf
[21] These include Humboldt, North Coast/North Bay, Sierra, Stockton, Greater Fresno, Kern, LA Basin, San Diego/Imperial Valley, Greater Bay Area, and Big Creek/Ventura.
[22] Historical local area requirements can be found in Appendix 3.

The RA Program defines "flexible capacity need" as the quantity of economically dispatched resources needed by the CAISO to manage grid reliability during the greatest three-hour continuous ramp of each month. Resources are given an "effective flexible capacity (EFC)" value if they can sustain or increase output, or reduce ramping needs.[23] The CPUC incorporated flexible capacity requirements into the RA program and established flexible capacity RA obligations beginning in 2015. The current RA proceeding[24] is considering a "durable" flexible capacity definition that could change the definition of flexible capacity need and/or how EFC is calculated.

Staff compared the RA flexible capacity requirements to the amount of flexible capacity under contract for the month of December for ten years (2016 - 2025). Additionally, staff compared the total amount of flexible capacity available within the CAISO territory for the years 2015 and 2016 to what was under contract in those years. Staff determined the total amount of flexible capacity available by examining the CAISO's 2015 and 2016 Effective Flexible Capacity List.[25] Staff analyzed December because, as opposed to the system capacity peak that occurs in August, December had been identified as the month with the highest flexibility need and requirements.

Figure 2 2016 Flexible RA Requirement by Month for CPUC Jurisdictional LSEs



[23] The need to adjust electricity production output levels and start and stop production to meet changes in electricity net demand.
[24] R.14-10-010.
[25] https://www.caiso.com/Documents/FinalEffectiveFlexibleCapacityList2016.xlsx.

Results

The assessment of the contract data is only a snapshot of the capacity contracted as of October 2015, but provides some indication of forward contracting practices. It is important to note that capacity procurement is an ongoing exercise and that the data presented will undercount actual procurement to date (e.g., any procurement occurring after October 2015 is not included in this analysis). In addition, resources may be under contract to non-CPUC jurisdictional LSEs but data from those entities was not captured by our report. Additionally, this assessment does not include the capacity approved in Application 14-11-012 to address the need in the Western Los Angeles Basin, because the Commission Decision approving the capacity (D. 15-11-041) occurred after the data request submission deadline.[26] It also does not include other procurement of existing and new resources that has occurred subsequent to the staff data request.

Contract Landscape

For the ten-year period examined, as of October 2015, there were 1,070 existing contracts corresponding to 746 unique resources. An individual resource can hold more than 1 contract and often has various different contract obligations. Of the resources with existing contracts, 41 of them were from facilities that, at the time of the data request, were not-yet-online.

Table 1 Number of Resources and Contracts held by CPUC-Jurisdictional LSEs that are Part of the CAISO from Jan 2016 through Dec 2025 (as of Oct 2015).

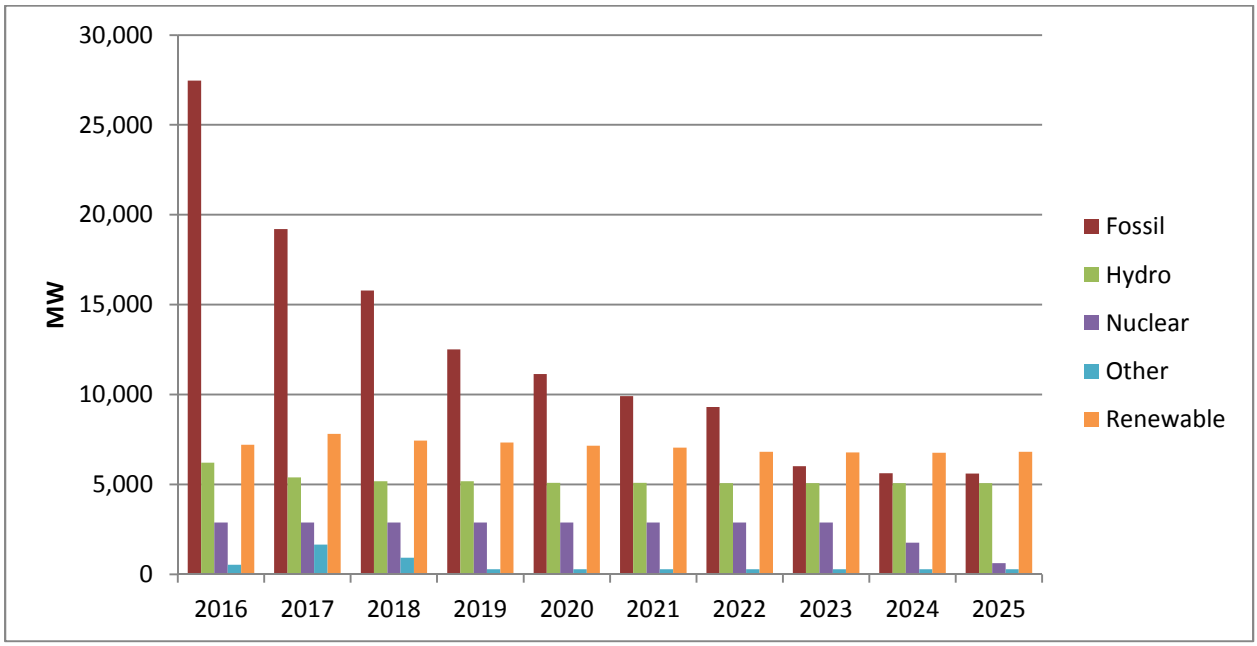
	On-Line	Not-Yet-Online	Total
Resources	705	41	746
Contracts	902	168	1070

Available and Contracted Capacity

The majority of the forward contracted capacity comes from fossil resources. Figure 3 shows the significant decline in the capacity contracted from fossil resources from 2016 through 2025. Because of this major decline, staff chose to explore the types of fossil units being contracted.

[26] Approved November 19, 2015.

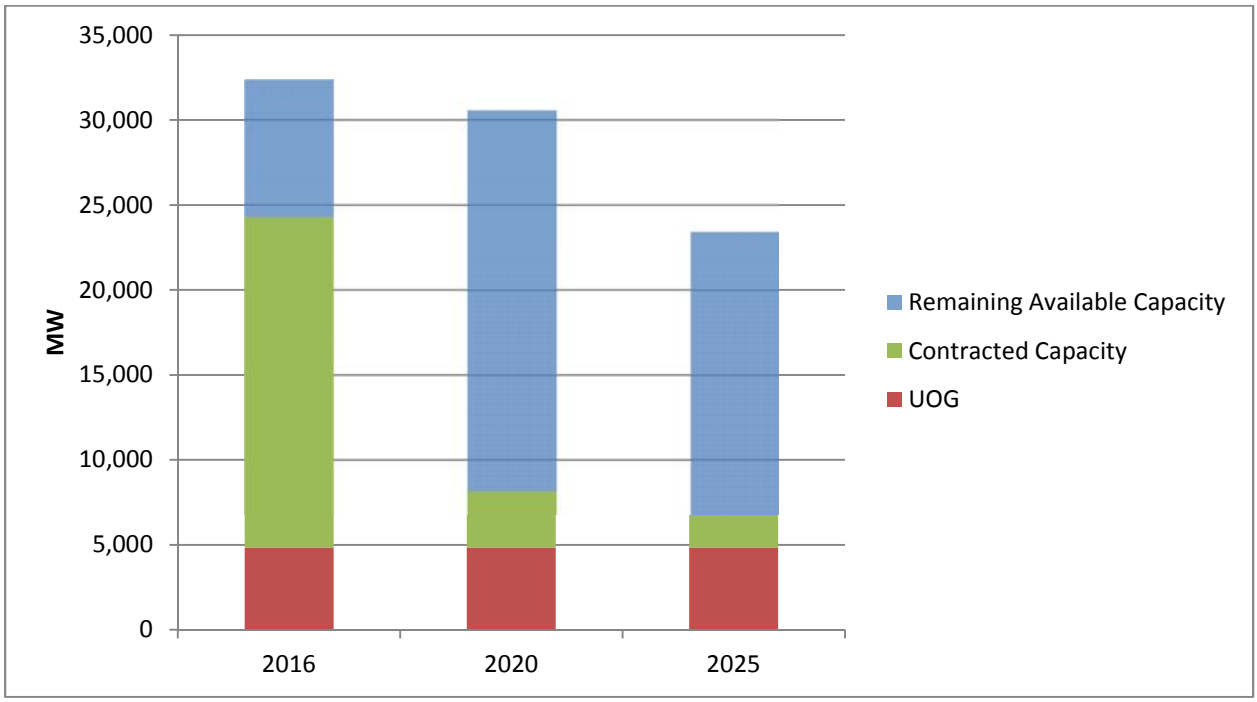
Figure 3 Technologies[27] with 10 Year Forward Contracts – August



The 2016 NQC List identifies 32,383 MW of non-cogeneration fossil capacity available in August 2016 (Figure 4). Of that available non-cogeneration fossil capacity, 75 percent were under contract for August 2016. In order to compare the amount of capacity forward contracted to the amount available, we forecast what would be available in 2020 and 2025 based on rules adopted in the LTPP Planning Assumptions and Scenarios Document[28] for counting additions and retirements.

[27] Technologies classified as "Other" include imports and demand response.
[28] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M155/K277/155277948.PDF

Figure 4 Fossil (Non-Cogeneration) Capacity - August



From 2016 to 2020, 2,187 MW of fossil capacity (1,382 MW of combined-cycle capacity and 805 MW of combustion turbine capacity) is expected to be added to the system while 5,356 MW of non-cogeneration capacity will be removed for a net loss of 3,169 MW. From 2020 to 2025, 262 MW of fossil capacity (all combustion turbine) will be added to the system while 7,422 MW of non-cogeneration fossil capacity will be removed, primarily steam units (see Figure 5), for a net loss of 7,160 MW. Figure 4 illustrates that in 2016, 25 percent of the available non-cogeneration fossil capacity is not under contract. The percentage that remains un-contracted increases to 73 percent in 2020 and then slightly decreases to 71 percent in 2025.

Figure 5 Fossil (Non-Cogeneration) Capacity by Unit Type - August

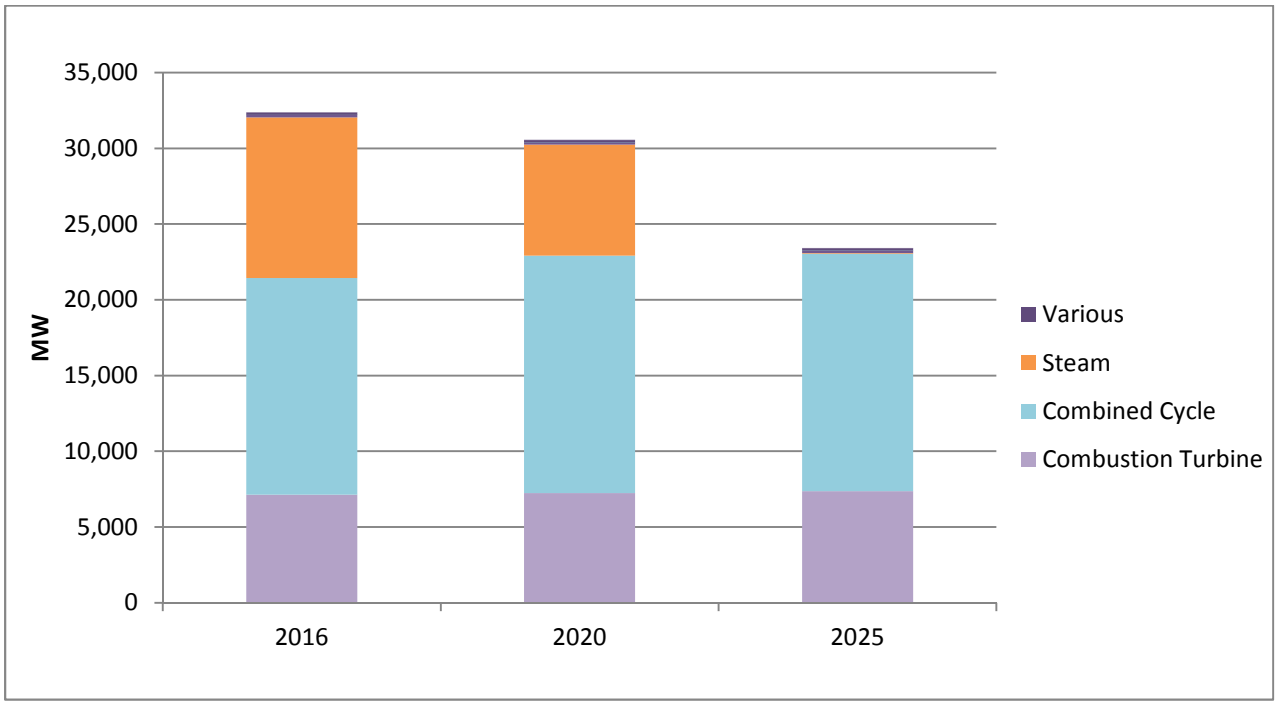


Figure 5 classifies the data depicted in Figure 4 by unit type. Reciprocating engine, internal combustion, and peaker units (not otherwise classified as combustion turbines) each represent less than 0.7 percent of the total available non-cogeneration fossil capacity ("various" in Figure 5). Because they represent a small percentage of the available non-cogeneration fossil capacity and because most of the steam units will be retired due to once-through cooling requirements by 2025, staff concentrated on examining non-cogeneration combustion turbine and combined-cycle units to identify whether the capacity available in August is contracted.

Figure 6
Combustion Turbine (Non-Cogeneration)
August Capacity

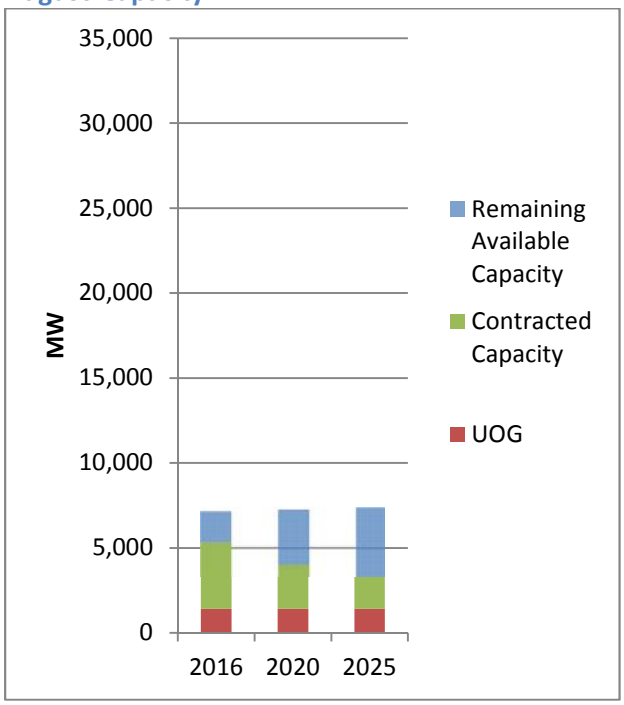


Figure 7
Combined Cycle (Non-Cogeneration)
August Capacity

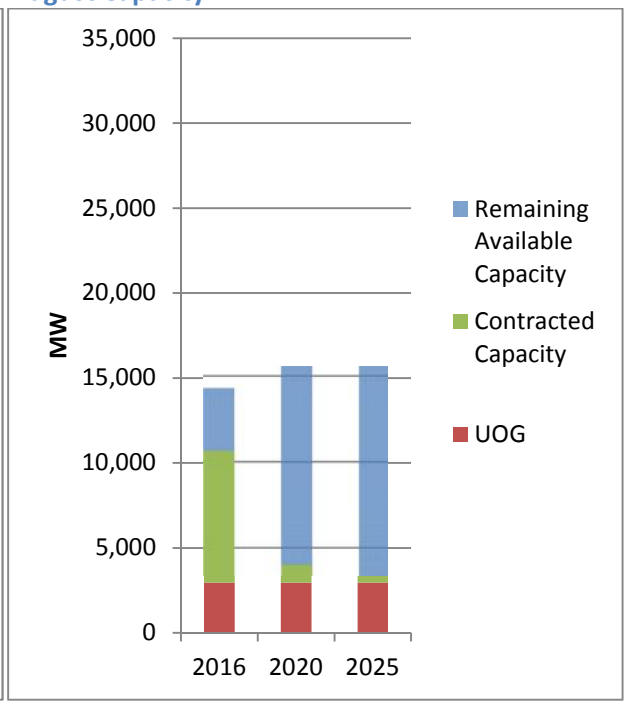


Figure 6 illustrates that of all the combustion turbine capacity (excluding cogeneration) available, 25 percent was not contracted in 2016. The percentage of combustion turbine capacity without a contract increases to 44 percent by 2020 and to 55 percent by 2025. Figure 7 illustrates that of all the combined cycle capacity available, 26 percent was not contracted in 2016. The percentage of combined cycle capacity without a contract increases to 74 percent by 2020 and to 79 percent by 2025.

Even though the amounts of combustion turbine and combined cycle capacity available increase through 2025, the amount of fossil capacity available to the system overall decreases through 2025. Combined cycle and combustion turbine units are being built to replace retiring steam units. Even with these added replacement units, the net amount of fossil capacity available to the system in 2016 is reduced by 9,212 MW in 2025.

System Capacity

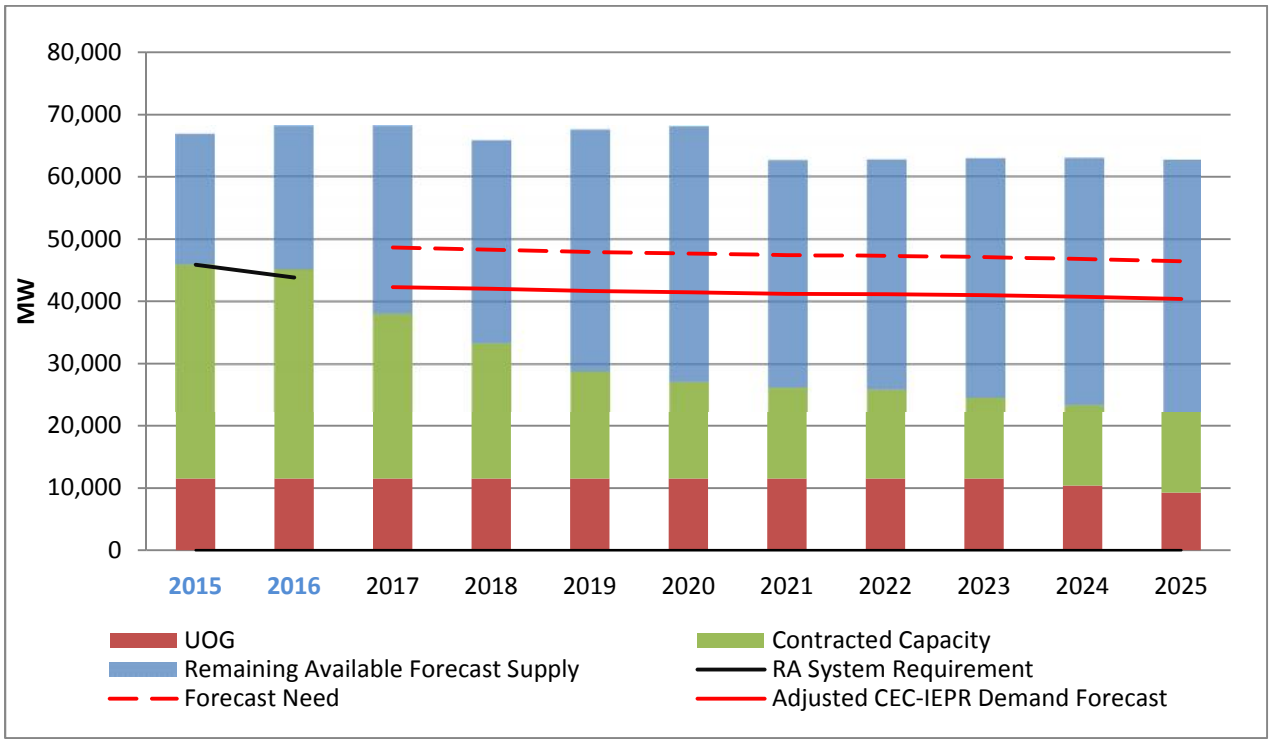
In analyzing forward procurement for system capacity needs, staff found that the amount of resources available for procurement exceeds the system forecast need using the existing LTPP Planning Assumptions and Scenarios Document for retirements and additions. The LTPP assumes that this surplus of resource availability remains constant through 2025. However, the amount of resource capacity under contract in farther out years declines.

Staff found the adjusted CEC-IEPR demand forecast to be nearly flat from 2017 through 2025. The CEC forecast experiences year to year decreases of less than 1%.

As expected, the amount of contracted system capacity meets the next year RA requirement but declines outside of the RA compliance year (Figure 8). This decline begins two years out (2017) where there is a 16 percent reduction from the previous year in the amount of capacity contracted and 78 percent of the forecast need is contracted. By 2023 (seven years out from 2016), half of the forecast need has already been contracted. In the ten year time span examined, forward procurement practices move from exceeding the RA requirement in 2016 to having 48 percent of the forecast need contracted in 2025.

The amount of UOG available to the system remains relatively stable throughout the ten year period.[29] In 2016, UOG constitutes around one-fourth of the capacity used to meet the LSEs RA obligation. Ten years out, UOG accounts for around 46 percent of the contracted capacity amount and 20 percent of the forecast need.

Figure 8 Contracted System Capacity Compared to Forecast Demand and System RA Obligations (August)



These results are consistent with prior observations of August contracted system capacity from the June 2014 *Joint Reliability Plan Track One Staff Report.* System capacity meets RA requirements and is

[29] UOG values in 2024 and 2025 reflect that in 2024 Unit 1 and in 2025 Unit 2 of PG&E's Diablo Canyon plant will be taken offline.

contracted for 78 percent of the forecast need two years ahead. And 69 percent of the forecast need is contracted three years ahead.

Local Capacity

Forward procurement for local capacity follows the same trend for the areas staff examined. The RA requirement is successfully met in 2016 in all of the local capacity areas (Figure 9). Outside of the RA compliance year all local areas experience a significant decline in contracted capacity while the amount of UOG available remains constant through 2025.

The forecast requirements presented in Figure 9 serve as indicative values based on the Local Capacity Technical Analyses. There is no guarantee that the 2020 forecast local requirement will be the actual RA requirement since the local RA requirement is established on an annual basis. The change from the 2016 RA requirement to the forecast value in 2020 varies from local area to local area. In some areas the local area need increases, while in others it decreases.

There are ten local capacity areas in California. In order not to reveal short positions in locally constrained areas, for this analysis, areas were combined into Northern California (Humboldt, North Coast/North Bay, Greater Bay Area, Sierra, Stockton, Greater Fresno, Kern) and Southern California (LA Basin, Big Creek/Ventura, San Diego/Imperial Valley).

Figure 9a Northern California Contracted Local Capacity in August (Aggregation of Humboldt, North Coast/North Bay, Sierra, Stockton, Greater Fresno, Kern, and Greater Bay Area)

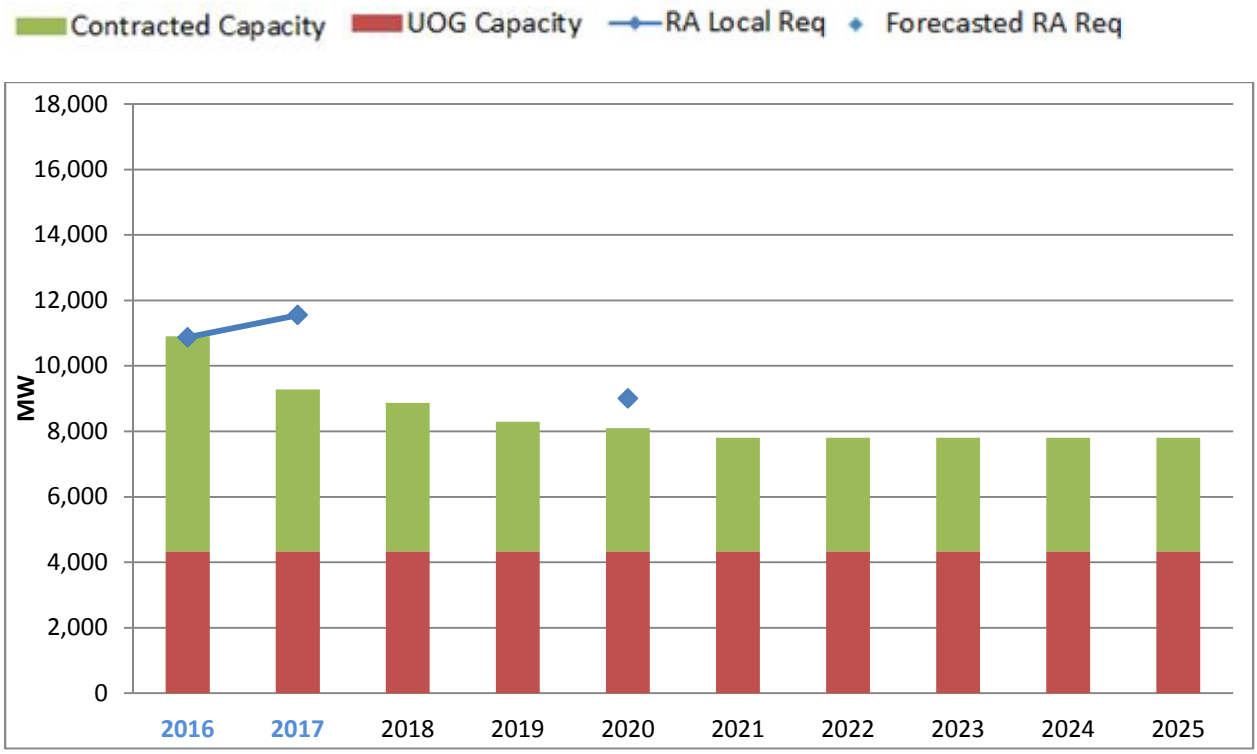
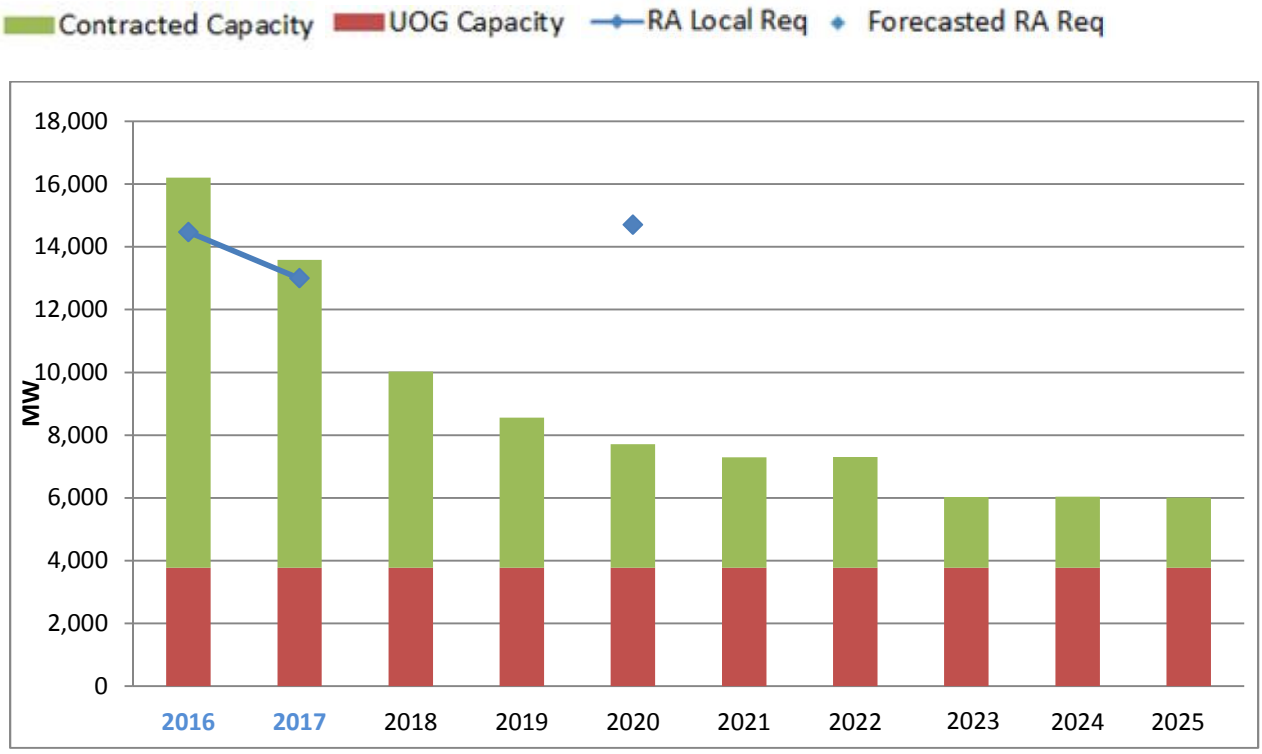


Figure 9b Southern California Contracted Local Capacity in August (Aggregation of Big Creek/Ventura, LA Basin and San Diego/Imperial Valley)



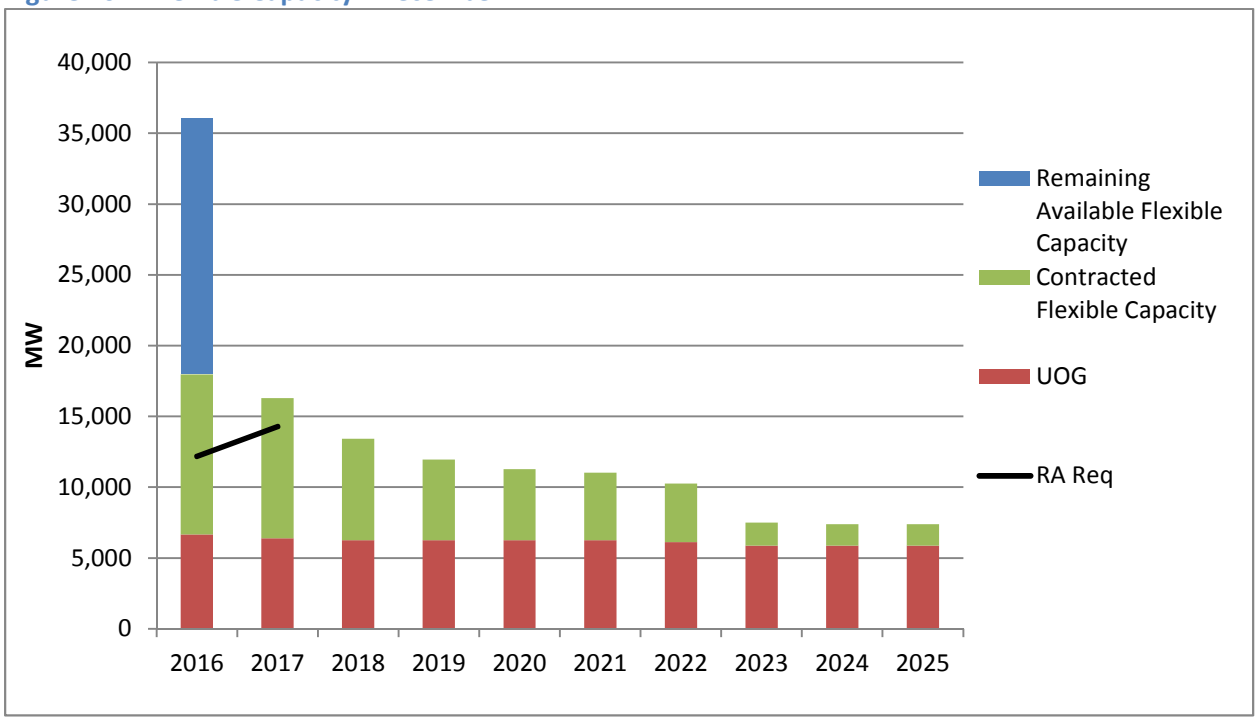
From 2016 to 2017 the local RA requirement increases by 682 MW in the Northern California area. This aggregation of the local areas in Northern California illustrates a decrease in contracted capacity of twenty-five percent one year forward (2017) with a simultaneous six percent (682 MW) increase in the local capacity requirement. The amount of currently contracted capacity meets ninety percent of the 2020 forecast requirement.

From 2016 to 2017 the local RA requirement aggregation representing the local areas in Southern California decreases by 1474 MW. This area also experiences a decrease in contracted capacity of twenty-one percent. However, the 2017 requirement is already met by the currently contracted capacity for the aggregated area as a whole. Yet two years forward (2018) the region experiences another substantial decrease in contracted capacity. From 2017 to 2018 the amount of contracted capacity decreases by thirty-six percent. Four years forward fifty-two percent of the 2020 forecast RA requirement has been contracted. And the amount of contracted capacity continues to decrease year to year stabilizing in 2023.

Flexible Capacity

The amount of flexible capacity under contract in 2016 and 2017 exceeds the flexible requirement for each of those years (Figure 10). RA flexible requirements vary month to month based on the monthly forecast need. Staff examined flexible capacity for the month of December[30] and found that contracted flexible capacity steadily decreases through 2025.

Figure 10 Flexible Capacity - December



[30] December had been identified as the month with the highest flexibility need and requirements thus far.

LSEs contracted capacity above the flexible RA requirement (33 percent more) in 2016. In 2016, 37 percent of RA capacity comes from UOG. LSEs contract 12 percent less capacity in 2017 than in 2016. In 2018, the amount of capacity contracted decreases again by 28 percent. This decrease in the amount of flexible capacity contracted continues through 2025 where the amount of capacity under contract is less than half of what it is in 2016 and 60 percent of the 2016 RA requirement (assuming it remained constant). Eighty percent of capacity contracted for 2025 is made up of UOG.

Throughout the ten year period, the amount of flexible UOG remains relatively constant but becomes a greater portion of the available flexible capacity. In 2016, 63 percent of the UOG is from hydro resources and the remainder from fossil resources.

The portion of contracted capacity that is not UOG primarily consists of fossil resources. The capacity under contract decreases from 2016 through 2025 but the portion of this capacity coming from fossil resources remains constant. For the entire ten year period 96 percent or more of the contracted capacity comes from fossil resources. Of these fossil resources, 76 percent of the flexible capacity provided is under contract for five or more years. The small percentages of contracted capacity not from fossil resources are from hydro or renewable facilities.

There are 18,068 MW in 2016 of flexible capacity within the CAISO balancing authority that is available, but not contracted for flexible RA. The remaining available flexible capacity (Figure 10) is not shown after 2016 because staff chose to not make any assumptions about what would be available for years where the Effective Flexible Capacity List[31] has not yet been published. The need for more or less flexible capacity depends on whether the resources available in 2016 remain available in future years and future RA flexibility requirements. These results (Figure 10) are in line with what was seen in June 2014 in the *Joint Reliability Plan Track One Staff Report* for the amount of contracted flexible capacity available in December.

Conclusion

Staff has reached four conclusions from analyzing the contracts database.

1. The amount of system capacity contracted steadily declines over the ten year period examined to 48 percent of the forecast need ten years out.
2. The amount of local area capacity under forward contract varies across local areas but follows the same trend. After 2016, the amount of forward contracted capacity decreases, but all local capacity areas have already contracted all or more than half of the 2017 local area requirement.
3. The amount of contracted flexible capacity exceeds the established RA requirements but decreases through 2025 to levels that are approximately three-fifths of the 2016 requirement.

[31] https://www.caiso.com/Documents/FinalEffectiveFlexibleCapacityList2016.xlsx.

4. There are significant amounts of available non-cogeneration combined cycle and combustion turbine capacity without long-term contracts.

Additionally, staff notes there is overcapacity (see Figure 8) in the market. Procurement subsequent to the establishment of this data set[32] will increase the capacity under long term contract, but many resources will also retire due to once through cooling requirements.

This assessment is in line with the previous assessment made in the *Joint Reliability Plan Track One Staff Report*[33] and demonstrates that forward contracting practices have remained stable since the prior study. Staff will continue to survey contracted capacity as a yearly exercise to assess forward contracting practices.

[32] See D.15-11-041 LA Basin, D.16-05-050 Moorpark, storage procured pursuant to D. 10-03-040.
[33] http://cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=9107.

Appendix 1

Data Request

The following is the emailed data request and Excel template that staff sent to the LSEs.

Dear Load Serving Entity Representative,

The California Public Utilities Commission (CPUC) is requesting information about your generator contracting positions. This information will be used to inform the Joint Reliability Plan (JRP) Track 2 proceeding (R14-02-001). This data request seeks information consistent with the subpoenas served in May 2014 and as modified by comments received by Load Serving Entities (LSEs) from the track 2 JRP workshop of April 9, 2015.

Please fill out the attached Microsoft Excel spreadsheet according to the instructions contained in the respective tab. Please include, by month, the energy, or system, local and flexible capacity amounts under contract for each resource. Please provide information for all resources including conventional generation, renewable, Demand Response and storage resources that are owned, in whole or in part, by the LSE or under contractual commitment to the LSE for all or a portion of its capacity. Please do not include information related to the sale of capacity to other parties. For energy only contracts, please include the amount of energy under contract for each month. Please provide information for system, local and flexible capacity amounts by month consistent with existing reporting obligations to the CPUC's Resource Adequacy program, assuming the current definitions are in place for the next 10 years. The CPUC is requesting this information for each month starting in January, 2016 through December 2025.

If you claim that any documents or information requested is confidential or market sensitive as set forth in D.06-06-066, including in the IOU or ESP Matrix attached as Appendix 1 and 2 to D.06-06-066, please produce the requested documents and information with appropriate confidentiality markings and explain the basis for the confidentiality claims. Electronic files shall be named to indicate their confidentiality in the file name (e.g., "LSEData_LSENAME_2015Nov20_CONFIDENTIAL.xlsx").

Please return the completed data request by Friday, November 20, 2015. Send completed data via secure FTP to the CPUC using the instructions attached to this email.

If you have any concerns or objections regarding this request please email david.miller@cpuc.ca.gov immediately and no later than October 26, 2015. For additional questions, please contact david.miller@cpuc.ca.gov.

Thank you for your support.

-dm-

Excel Template Instructions

	A	B	C
1	**Instructions**	Please include, by month, the energy, or system, local and flexible capacity amounts under contract for each resource. Please provide information for all resources including conventional generation, wind, solar, DR or storage resources that are owned, in whole or in part, by the LSE or under contractual commitment to the LSE for all or a portion of its capacity. Please do not include information related to the sale of capacity to other parties. For energy only contracts, please include the amount of energy under contract for each month. Please provide information for system, local and flexible capacity amounts by month consistent with existing reporting obligations to the CPUC's Resource Adequacy program. The CPUC is requesting this information for each month starting in January, 2016 through December 2025.	
2			
3			
4	**Data Field Descriptions**	**Data field descriptions**	**Comment**
5	**LSE Name**	Name of Load Serving Entity. Please select from dropdown menu.	These three fields (LSE Name, Resource ID and Contract ID) represent a unique ID for each capacity position being held by the LSE. A single capacity contract can span multiple resources, and a capacity transaction for a single resource can be captured across multiple contracts.
6	**Resource ID**	CAISO Resource Scheduling ID. Please select from dropdown menu. If Resource ID does not appear in dropdown menu, please enter appropriate resource ID.	
7	**Contract ID**	This is the LSE unique contract Identifier	
8	**Contract Type**	Options are: IOU/LSE Owned generation, RA Only, RA + Other, Energy Only. Please select from dropdown menu.	"Other" can refer to tolling or any other non pure RA position
9	**Resource Name**	Name of resource. Indicate specific units under contract if applicable.	
10	**Technology**	See table below	
11	**Technology - Other**	Description of technology if "Other"	
12	**CHP**	Does this facility meet the definition of a Combined Heat and Power generation facility under PU Code Section 216.6 (Y/N)	
13	**OTC**	Is this a once through cooling unit? (Y/N)	
14	**QF**	Is this a FERC certified Qualifying Facility? (Y/N)	
15	**RPS**	Is this an RPS eligible resource? (Y/N)	
16	**YEAR_MONTH_Enrg**	Energy only contract amount (MW) for each MONTH and YEAR	Please include the capacity under contract (MW) associated with energy only contracts for each month, where applicable.
17	**YEAR_MONTH_Sys**	System capacity contract amount (MW) for each MONTH and YEAR	Please provide information for system, local and flexible capacity amounts (MW) by month consistent with existing reporting obligations to the CPUC's Resource Adequacy program.
18	**YEAR_MONTH_Locl**	Local capacity contract amount (MW) for each MONTH and YEAR	
19	**YEAR_MONTH_Flex**	Flexible capacity contract amount (MW) for each MONTH and YEAR	
20			
21			
22	**Technology Type**	**Definition**	
23	Nuclear	Any nuclear capacity procurement in your service territory (if applicable).	
24	Fossil	All fossil generation including natural gas, coal and hydro-carbons (diesel, gas etc.)	
25	Hydro	Non-RPS eligible hyro-electric generation (do not include pumped storage)	
26	Renewable	All RPS eligible renewable generation (do not include pumped storage)	
27	Storage	All non-RPS storage units (*including pumped storage*, batteries, compressed air, etc.)	
28	Demand Response	All Demand Response resources	
29	Other	Any RA capacity that does not fit into the definitions above.	

Excel Template Data Entry Format

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	**LSE Name**	**Resource ID**	**Contract ID**	**Resource Name**	**Contract Type**	**Technology**	**Tech Other**	**CHP**	**OTC**	**QF**	**RPS**	**Namplate (MW)**	**2016_Jan_Enrg**	**2016_Jan_Sys**	**2016_Jan_Locl**	**2016_Jan_Flex**
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Appendix 2

Overcoming Deficiencies in the Data Collected

1. Staff obtained information that was not collected through the data request (e.g. location of resource and more precise information about the technology type) by cross-referencing the Resource IDs provided in the data request with those in the 2016 NQC List as well as those in the Master Generating Capability List. The CAISO splits resources into "ISO Classification"[34] and a sub category "Unit Type".[35] Through private conversation with CAISO staff, Energy Division staff learned that the CAISO does not provide definitions of these category types. To determine more specific details than those provided in the data request about the resource technology types, staff adopted the CAISO's technology classifications and assumed the broadest common knowledge definitions for the category types.

2. Staff found that not all of the known Utility-Owned Generation (UOG) was included in what the LSEs submitted to form the contracts database. To account for missing UOG capacity staff used the Master Generating Capability List to determine the total amounts of UOG and determined the location of those UOG resources by cross-referencing the 2016 NQC List. Any UOG capacity determined to be missing from the contracts database was added in.

3. Staff found that the amount of capacity coming from demand response programs was not consistently entered into the data responses. For this reason, staff did not include capacity from demand response in this analysis.

[34] Biogas, biomass, cogeneration, geothermal, hydro, nuclear, peaker, pseudo tie, solar, storage, thermal, wind.
[35] Battery, combined cycle, combustion turbine, fuel cell, hydro, internal combustion, peaker, photo voltaic, pumped storage, reciprocating engine, steam, wind.

Appendix 3

Historical Local Area Requirements

Local area requirements have on average increased 1.46 percent over time. Table 2 shows historical local area requirements from 2010 to 2016. The requirements for most local areas have remained relatively stable. Occurrences such as the development of transmission into an area would cause a dramatic change in the requirement for a local area.

Table 2 Historical Local Area Requirements (MW) for the Years 2010 through 2016

Area	2010	2011	2012	2013	2014	2015	2016
Humboldt	176	205	212	212	195	166	167
North Coast / North Bay	790	734	613	629	623	550	611
Sierra	2102	2082	1974	1930	2088	2200	2018
Stockton	681	682	567	567	701	707	808
Greater Bay	4651	4878	4278	4502	4638	4367	4349
Greater Fresno	2640	2448	1907	1786	1857	2439	2519
Kern	404	447	325	525	462	437	400
LA Basin	9735	10589	10865	10295	10430	9097	8887
Big Creek/Ventura	3334	2786	3093	2241	2250	2270	2398
San Diego	3214	3207	2944	3082	4063	4112	3184