Standard LSE Plan

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

2022 INTEGRATED RESOURCE PLAN

NOVEMBER 1, 2022

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I. Introduction and Executive Summary

a. Introduction

Description of The Regents of the University of California

The University of California is the world's leading public research university system, comprised of 10 campuses, 5 medical centers, 3 national labs, more than 280,000 students and 230,000 faculty and staff. The Regents of the University of California ("UC"), in its role as an Electric Service Provider ("ESP"), does not have a service area and does not serve customers in the traditional sense. Instead, UC manages an energy supply portfolio on behalf of participating Direct Access ("DA") campuses and facilities through a combination of short- and long-term purchases and sales. UC is the primary commodity electricity provider for the following UC campuses and facilities:

- UC San Francisco and Medical Center
- UC Santa Cruz
- UC Merced
- UC Santa Barbara
- UC Irvine and Medical Center
- UC San Diego and Medical Center
- UC Office of the President
- Portions of UC Berkeley, UC Davis and Medical Center, UC Los Angeles and Medical Center, and UC Agriculture and Natural Resources Facilities

UC operates the ESP on a not-for-profit basis, and only serves UC-affiliated DA-eligible electricity accounts.

UC's Mission

The distinctive mission of UC is to serve society as a center of higher learning, providing long term societal benefits through transmitting advanced knowledge, discovering new knowledge, and functioning as an active working repository of organized knowledge. That obligation, more specifically, includes undergraduate education, graduate and professional education, research, and other kinds of public service, which are shaped and bounded by the central pervasive mission of discovering and advancing knowledge.

In 2013, UC announced its Carbon Neutrality Initiative, committing the University to net zero greenhouse gas ("GHG") emissions by 2025. This goal was a first for any major research university and represents a significant acceleration of the state's GHG reduction goals. In addition to the Carbon Neutrality Initiative, each individual university campus has adopted its own sustainability goals leading to substantial investments in energy efficiency and behind-the-meter renewable generation. University campuses have collectively installed nearly 50 MW of behind-the-meter solar generation. The Clean Power Program ("CPP"), whereby UC operates as an ESP, plays an important role achieving net carbon neutrality. UC began serving its own DA load in January 2015, with the goals of providing transparent, cost-effective, and low-carbon

electricity. UC's CPP procurement falls under the umbrella of a number of internal system-wide policies, including but not limited to:

- Policy on Sustainable Practices[1]
- Purchases of Goods and Services[2]
- Diversity Statement[3]

Introduction to UC's IRP

In accordance with the requirements of California Public Utilities Code PUC Sections 454.51 and 454.52 and California Public Utilities Commission ("Commission") Decision ("D.") D.22-02-004, *Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plan Filings*,[4] and guidance provided by the Commission's Energy Division, UC is providing its load-serving entity ("LSE")-specific IRP to the Commission for approval and use in the Commission's statewide planning process. In addition to this narrative, UC's IRP includes the following documents:

- UC's 30 MMT Resource Data Template and Clean System Power Calculator
- UC's 25 MMT Resource Data Template and Clean System Power Calculator
- UC's IRP Verification

Projecting resource needs over the planning horizon covered by the IRP is a fluid process and UC expects changes over time. The future resources identified in UC's IRP represent UC's current good-faith projection of the resource mix that will be procured over the IRP planning horizon, based on currently available information. Such projections are based on best available information regarding planning directives, UC policy, resource availability and other key considerations. The resources identified in future iterations of UC's IRP may change due to new information and evolving circumstances, and the ultimate resource mix that UC actually procures (in future years) may differ from what is reflected in this plan due to a number of variables, including availability of supply, technology changes, price of supply, and/or other market or regulatory considerations. Furthermore, as described in UC's 2022 Renewables Portfolio Standard Procurement Plan, UC's recent renewable energy solicitations have been aimed at procuring renewable energy for all UC campuses, not limited to the needs of UC in its role as an ESP. For this reason, and as a result of ongoing portfolio optimization activities, the ultimate resource mix that is retired for compliance purposes may differ from the currently planned or procured quantities.

Examples of future regulatory changes include the upcoming "Slice of Day" framework for the Resource Adequacy ("RA") program, ongoing implementation of the Central Procurement Entity

[1] *Available at* https://policy.ucop.edu/doc/3100155/SustainablePractices.

[2] *Available at* https://policy.ucop.edu/doc/3220485/BFB-BUS-43.

[3] *Available at* https://regents.universityofcalifornia.edu/governance/policies/4400.html.

[4] Rulemaking ("R.") 20-05-003*, Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plan Filings* ("Final Ruling"), June 15, 2022.

("CPE"), as well as structural, programmatic changes to the IRP program. Though the impact of these changes is uncertain at this time, they have the potential to materially reshape how capacity and energy are valued for reliability purposes, and in turn, such changes may impact UC's future procurement decisions. UC will continue to monitor and engage in Commission proceedings and incorporate pertinent planning and procurement adaptations, as necessary.

As directed in D.22-02-004 and the *Final Ruling*, UC is submitting two Conforming Portfolios – a 30 MMT Conforming Portfolio which achieves emissions that are equal to or less than UC's proportional share of the 38 million metric ton ("MMT") greenhouse gas ("GHG") target by 2030 and 30 MMT target by 2035 ("30 MMT"); and a 25 MMT Conforming Portfolio which achieves emissions that are equal to or less than UC's proportional share of the 30 MMT GHG target by 2030 and 25 MMT target by 2035 ("25 MMT"). UC is not submitting any alternative portfolios. Please note, UC has used the same Confirming Portfolio – referred to herein as UC's Preferred Conforming Portfolio ("PCP") - to achieve both its 30 MMT and 25 MMT Conforming Portfolios. The portfolio inputs are the same but the outputs in the CSP and Reliability sections of the RDT will differ based on the 25 MMT and 30 MMT targets.

As set forth below, UC's IRP achieves the goals set forth in the Public Utilities Code Section 454.52(a)(1) through a diversified portfolio consisting of both short-term and long-term electricity, electricity-related, and demand reduction products. As such, UC respectfully requests that the Commission approve its IRP.

b. Executive Summary

This narrative provides a detailed description of the development and content of UC's PCP, the portfolio's compliance with applicable requirements, and an action plan detailing UC's next steps (to promote conformance with such requirements).

UC developed its IRP through the following steps:

- UC compiled data for its existing energy contracts, RA capacity contracts, and its share of capacity for allocated Cost Allocation Mechanism ("CAM") resources using the guidance provided by the Energy Division.
- For each IRP planning year, UC identified its short positions relative to known planning targets and its assigned load forecast.
- UC populated the Resource Data Template with all current contracts.
- UC compiled detailed information on projects for which it is currently negotiating capacity and power purchase agreements, including information regarding project status and timing.
- UC identified future contracts it expects to secure for new solar, wind, demand response, and/or battery storage resources. UC prioritized the selection of future resources to ensure that UC's overall portfolio of new resources is varied, meets all regulatory goals and meets the goals expressed by UC's procurement and sustainability policies.
- UC used the Commission's Clean System Power ("CSP") calculator to check the GHG emissions associated with the resulting portfolio to ensure that these emissions are equivalent to UC's assigned share of both the 30 MMT and 25 MMT benchmarks.

- UC identified the resulting portfolio as both its 30 MMT and 35 MMT Conforming Portfolios.
- UC checked both its 30 MMT and 25 MMT conforming portfolios for reliability by comparing the total portfolio net qualifying capacity ("NQC") against UC's RA requirements and adding in sufficient RA capacity to ensure reliability. UC further established that its planned incremental capacity procurement exceeded its pro rata share of the related incremental capacity procurement obligation. UC's reliability sufficiency was verified through the "Reliability" tab of UC's 25 MMT and 30 MMT Resource Data Templates.

UC reached the following findings regarding its PCP:

- UC's PCP includes the procurement of the following new resources:
  - New solar resources totaling 45 MW
  - New wind resources totaling 105 MW
  - New grid connected battery storage of 30 MW
  - New geothermal resources totaling 1 MW (Capacity-Only)
  - New pumped storage resources totaling 1 MW (Capacity-Only)
- UC's PCP provides for the following overall resource mix in 2035:
  - 4 MW of Large Hydro
  - 105 MW of Wind
  - 125 MW of Solar
  - 31 MW of Short Duration Battery Storage
  - 1 MW of Geothermal (Capacity-Only)
  - 1 MW of Long Duration Storage (Capacity-Only)
  - 5 MW of Natural Gas/Baseload/Other (Capacity-Only)
- UC's PCP conforms to the procurement timing, resource quantities, and general resource attributes identified in the PSP.
- Using the 30 MMT scenario CSP calculator, UC's PCP would have 2030 emissions of -0.0045 MMT and 2035 emissions of 0.0064 MMT. This is less than UC's assigned share of 2030 and 2035 emissions ([redacted] and [redacted] MMT, respectively).
- Using the 25 MMT scenario CSP calculator, UC's PCP would have 2030 emissions of -0.0052 MMT and 2035 emissions of 0.0043 MMT. This is less than UC's assigned share of 2030 and 2035 emissions ([redacted] and [redacted], respectively).
- UC's PCP meets all relevant reliability metrics.
- UC's PCP provides approximately UC's load-proportional share of renewable integration resources.
- UC's PCP is consistent with the Commission's PSP and can be used in both the 30 MMT and 25 MMT consolidated statewide portfolios.

To implement its PCP, UC has developed the Action Plan described in Section IV, below. This action plan consists of continuing to monitor market, price, and technology trends, and conducting periodic solicitations for new resources as needed to comply with all applicable

Commission directives in tandem with pursuing UC system-wide carbon neutrality and other internal policy goals.

II. Study Design

a. Objectives

UC had the following objectives in performing the analytical work to develop its IRP:

1. Identify a 30 MMT Conforming Portfolio with emissions equal to or less than UC's proportional share of the 30 MMT GHG reduction benchmarks, as determined using the Commission's emissions calculator.
2. Identify a 25 MMT Conforming Portfolio with emissions equal to or less than UC's proportional share of the 25 MMT GHG reduction benchmarks, as determined using the Commission's emissions calculator.
3. Identify 30 and 25 MMT portfolios that achieve economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in Section 454.52(a)(1)(A-I).
4. Identify diverse and balanced 30 and 25 MMT portfolios that include both short-term and long-term electricity products as well as electricity-related demand reduction products.
5. Identify portfolios that achieve the resource adequacy requirements established pursuant to PUC Section 380 and provide UC's share of system reliability and renewable integration resources.
6. Identify portfolios that comply with all of UC system-wide goals and policies.
7. Identify portfolios that are compliant with UC's obligations under the Renewables Portfolio Standard ("RPS") program.
8. Identify portfolios that are cost-effective.

b. Methodology

i. Modeling Tool(s)

In developing its planned portfolios, UC used modeling tools including a dedicated financial portfolio model to quantify portfolio targets for renewable energy content, capacity, and portfolio GHG emissions, as well as physical and financial positions to ensure conformance with UC's risk management guidance and business practices.

UC uses a proprietary stochastic risk model, Hedgefox, as developed by The Energy Authority to assess annual, monthly, and hourly open positions, taking account of forecasted hourly electric loads and expected deliveries from UC's resource portfolio. UC uses its proprietary financial model developed with The Energy Authority to project power supply costs and incorporates existing and planned procurement into an overall financial assessment of revenues, costs, and cash flows.

UC also utilizes a commercially available energy trading and risk management system to monitor positions, market exposure, credit exposure, value-at-risk, and other risk management metrics.

HedgeFox

HedgeFox is a Monte Carlo simulation model of markets, resources and portfolios developed by The Energy Authority ("TEA"). HedgeFox utilizes a combination of methodologies from statistical approaches, data science, machine learning models, and operational research optimization. HedgeFox is used to take a deterministic price outlook and generate stochastically derived forward price shapes and resource production curves around it. This allows UC to value the performance of candidate portfolios under a range of potential price scenarios.

UC Financial Model

UC maintains a financial model that provides a multi-year point forecast of all revenue and cost streams. The Financial Model is used to evaluate comprehensive financial impact integrating the cost of energy, renewables, and resource adequacy.

For new resource selection, UC relied upon the modeling and assumptions in the Preferred System Portfolio, and on UC's ongoing and recent procurement experience, which provides insight into resource availability and cost. The mix of new resources selected in the Preferred System Portfolio is similar to the mix UC would select based on its procurement experience.

GHG emissions were assessed using the Commission's Clean System Power calculator for the 30 MMT and 25 MMT variations.

None of the tools used in modeling UC's portfolio are resource investment models, such as the Commission's RESOLVE model, so they do not include capacity expansion logic to directly derive resources that would be an optimal investment plan specific to the load UC serves, taken as an independent system. Instead, UC has utilized the tools above to develop the Preferred Conforming Portfolio that would allow UC to meet its assigned share of GHG emissions and system reliability, while meeting the broader objectives of its Clean Power Program. While this approach is more top-down than the RESOLVE model, the result is an IRP that can be easily evaluated by and incorporated into analysis by the Commission as part of this IRP cycle.

i. Modeling Approach

Load Forecast

UC developed this IRP using its assigned load forecast from the file 2022 Final GHG Emission Benchmarks for LSEs (also contained in the CSP templates), as directed in the Final Ruling. As an ESP, UC was required to calculate its own confidential GHG Emissions Benchmarks based on its 2030 and 2035 load shares, which it did by utilizing the "ESP GHG Benchmark" in the CSP calculator.

UC's assigned load forecast is as follows:

Table 1: UC's 2023-2035 Load Forecast (GWh)

Year	Load Forecast
2023	[redacted]
2024	
2025	
2026	
2027	
2028	
2029	
2030	
2031	
2032	
2033	
2034	
2035	

Load Shape

In developing its portfolio UC used the default load shape from the Clean System Power Calculator, which reflects the California Independent System Operator ("CAISO") hourly system average load shape forecast for the 2021 IEPR Mid Case.[5] UC also elected to specify that approximately 95% of UC's baseline demand comes from Commercial and Industrial ("C&I") loads, based on UC's historical load shape and unique service model. This customer input does not change UC's total annual energy volumes for both load and load modifiers, and these energy volumes remain consistent with UC's assigned load forecast.

Load-Proportional GHG Emissions Benchmark

UC's modeling was assessed against its 2035 load-proportional share of the respective 30 MMT and 25 MMT benchmarks, utilizing the CSP Calculator's *ESP GHG Benchmark* tab.[6] This assessment yielded the following results:

[5] *Final Ruling* at 3.

[6] See *2022.06.15 Narrative Template* at 6. Hereinafter, this calculation is referred to as "GHG Benchmarks".

Table 2: UC's Shares of GHG Reduction Benchmarks

2035 Load (GWh)	Proportion of 2035 Load within IOU Territory	2035 GHG Benchmark – 30 MMT Scenario	2035 GHG Benchmark – 25 MMT Scenario
[redacted]	[redacted]	[redacted]	[redacted]

Compiling Existing Resources

To populate its baseline resource templates, UC added existing resources from the following procurement categories:

- Energy Contracts
- Capacity (Resource Adequacy) Contracts
- UC's assigned share of capacity for CAM resources, taken from Energy Division's Aggregated CAM Resources for LSEs Plan Development
- UC's allocation of GHG-free resources from Southern California Edison Company ("SCE") and Pacific Gas and Electric Company ("PG&E")

Selecting New Resources

To identify its new resource procurement opportunities, UC first determined the new resource capacity it intends to add each year, which considered resource needs (open positions), long-term renewable contracting requirements, renewable portfolio standards, resource adequacy requirements, the need for incremental resource adequacy capacity to contribute to system reliability and renewable integration needs, the potential for technological improvements, and financial considerations. UC selected resource types based on its experience with competitive solicitations for new renewable and storage resources, its experience in procuring resource adequacy resources, as well as consideration of the studies and modeling underlying the adopted PSP.

Confirming Reliability

UC's portfolios were evaluated to ensure that sufficient dependable capacity (i.e., NQC) is available to meet peak load requirements, as shown in the RDTv3. This includes a 14% Perfect Capacity ("PCAP") Planning Reserve Margin.[7] UC used technology-specific Effective Load Carrying Capacity ("ELCC") factors provided by the Commission to assess the contribution of each resource to system reliability. In order to ensure that its portfolio met the reliability requirements, UC added sufficient short-term RA capacity in each year. UC's portfolios also include existing and new resources intended to help meet UC's incremental resource adequacy capacity obligations from D.19-11-016 and D.21-06-035.

Calculating GHG Emissions

UC calculated the emissions associated with its 30 MMT and 25 MMT conforming portfolios using the Commission's Clean System Power calculator. The assigned load forecast and default

[7] See *Workshop: Reliability Filing Requirements for Load Serving Entities' 2022 Integrated Resource Plans-Results of PRM and ELCC Studies* (July 29, 2022) at Slide 31.

load shapes and behind the meter adjustments were used for this assessment, along with the planned supply portfolios. The results were checked against the assigned GHG Benchmarks included in the Clean System Power tools.

III. Study Results

a. Conforming and Alternative Portfolios

As required by the Commission, UC is submitting two conforming portfolios – a 30 MMT Conforming Portfolio that achieves UC's share of the 38 MMT by 2030 and 30 MMT by 2035 GHG targets; and a 25 MMT Conforming Portfolio that achieves UC's share of the 30 MMT by 2030 and 25 MMT by 2035 GHG targets. As noted above, UC has used the same Confirming Portfolio –UC's PCP - to achieve both its 30 MMT and 25 MMT Conforming Portfolios. The portfolio inputs are the same but the outputs in the CSP and Reliability sections of the RDT will differ based on the 25 MMT and 30 MMT targets. UC is not submitting alternative portfolios.

UC's 2022 PCP

Table 3, below, provides a summary of UC's PCP in 2035, identifying resources by type and distinguishing between the following procurement categories:

- Existing resources (energy and capacity) that UC owns or contracts with, consistent with definitions provided in the Resource Data Template.
- Existing resources (energy and capacity) that UC plans to contract with in the future.
- Existing resources (capacity) that UC partially pays for through CAM.
- New Resources (energy and capacity) under development that UC is planning to procure.
- Future new resources (energy and capacity) that UC is planning to procure.

In summary, to meet UC's projected 2035 energy demand of [redacted], UC has selected a PCP composed primarily of the following resources:

- Existing solar (owned or under contract) – 80 MW
- Existing hydro (under contract) – 4 MW
- New solar (future resources, under contract) – 45 MW
- New wind (future resources) – 105 MW
- New geothermal (future resources) – 1 MW
- New short duration storage (future resources) – 30 MW
- New long duration storage (future resources) – 1 MW

Table 3: UC's Preferred Conforming Portfolio Resource Category Breakdown

Resource Category[8]	Under Development	Owned or Contracted	Planned Existing	Planned New	Total
Battery Storage	123 MWh capacity	0	0	0	123 MWh capacity
Large Hydro	0	15	0	0	15
Nuclear	0	1.52	0	0	1.52
Existing Solar California	42	148	0	0	190
Wind Existing California	0	0	0	63	63
Out-of-State ("OOS") Wind	0	0	0	292	292

Additionally, UC's PCP includes capacity-only resources composed primarily of the following resources:

- CAM, Demand Response and Energy Efficiency Allocations – 3 MW
- Existing natural gas, baseload, and other (planned procurement) – 4 MW

UC's PCP includes a mix of existing and new resources. Approximately 182 MW of UC's PCP is new nameplate capacity, reflecting UC's role as an active player in the State's development of new renewable and storage resources. Furthermore, UC's PCP is comprised of a mix of resources aimed at minimizing program costs on behalf of participating campuses while still achieving the State's GHG-reduction targets.

UC's 2022 PCP Is Consistent with the Preferred System Plan

The new resources included in UC's PCP are consistent with the PSP 2035 new resource mix. The Commission adopted the PSP, which established the 38 MMT GHG target by 2030 and 30 MMT GHG target by 2035 and adopted the resources in Tables 5 and 6 of D.22-02-004.[9]

The Decision identifies planned use of resources in the following categories: Gas, Biomass, Geothermal, Wind, Wind on New-Out-of-State Transmission, Offshore Wind, Utility-Scale Solar, Battery Storage, Pumped (Long-Duration) Storage, Shed Demand Response.

As demonstrated in Table 4, UC's PCP is generally consistent with UC's proportional share of new procurement for each of the "resource types" identified in D.22-02-004:

[8] Quantities in GWh, unless otherwise noted.

[9] D.22-02-004 at 101-105. Note the Decision references Tables 6 and 7, but this was presumably a typographical error since there was no foregoing Table 7. Thus, UC understands the Decision to be referencing Tables 5 and 6.

Table 4: Comparison of UC's PCP vs PSP

Resource Category	UC's PCP (MW)	UC's Proportional Share of PSP New Resources – 38 MMT PSP Scenario (MW)	UC's Proportional Share of PSP New Resources – 30 MMT PSP Scenario (MW)
Gas	5	[redacted]	[redacted]
Biomass	0	[redacted]	[redacted]
Geothermal	1	[redacted]	[redacted]
Wind	20	[redacted]	[redacted]
Wind On New OOS Transmission	85	[redacted]	[redacted]
Offshore Wind	0	[redacted]	[redacted]
Utility-Scale Solar	125	[redacted]	[redacted]
Battery Storage	30	[redacted]	[redacted]
Pumped (Long-Duration) Storage	1	[redacted]	[redacted]
Shed Demand Response	0	[redacted]	[redacted]

UC's proportional share of the PSP New Resources and the resources reflected in UC's are relatively aligned, with the notable exception of Offshore Wind and Wind on New OOS Transmission. Since California has little experience with Offshore wind, and because of the substantial quantity of OOS Wind UC is currently procuring, Offshore wind is not included in UC's PCP at this time. Further discussion is included in the applicable subsections of sections III and IV of this report.

b. Preferred Conforming Portfolio

ii. Preferred Conforming Portfolio

As demonstrated in Tables 3 and 4, UC's PCP consists of a combination of:

- Gas (capacity-only);
- Geothermal (capacity-only);
- Wind;
- Wind on New-Out-of-State Transmission;
- Large Hydro;
- Nuclear;
- Utility-Scale Solar;
- Short Duration Storage; and
- Long-Duration Storage (capacity-only).

As stated above, in accordance with Section 454.51(b)(3), UC has determined that the resource mix in its PCP achieves "economic, reliability, environmental, security, and other benefits and performance characteristics that are consistent with the goals set forth in [Section] 454.51(a)(1)]." These benefits and characteristics are discussed as follows.

GHG Reduction Goals

UC's PCP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(A) goal of meeting the Commission's 30 MMT GHG reduction benchmark (38 MMT GHG by 2030).[10] The 2035 emissions from UC's PCP in the 30 MMT CSP scenario are less than UC's load-proportional share of the 30 MMT GHG 2035 emissions target. UC's proportional share of the 30 MMT GHG target is [redacted] MMT in 2030 and [redacted] MMT in 2035. According to the Commission's emissions calculator, UC's PCP would account for -0.0045 MMT in 2030 and 0.0061 MMT in 2035 emissions in the 30 MMT CSP scenario, which is less than the GHG Benchmarks for UC.

UC's PCP also achieves emissions less than UC's proportional share of the 25 MMT GHG Benchmark. UC's Proportional Share of the 25 MMT Benchmark for 2030 is [redacted] MMT and for 2035 is [redacted] MMT. According to the Commission's emissions calculator, UC's PSP in the 25 MMT CSP scenario would account for -0.0052 MMT in 2030 and 0.0043 MMT in 2035, an amount less than the stated GHG benchmarks.

Renewable Energy

UC's PCP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(B) goal of ensuring that portfolios are composed of at least 60% eligible renewable resources. In 2035, UC's PCP would consist of 105% eligible renewable generation in the 30 MMT CSP scenario, which exceeds the 60% requirement. For the 25 MMT CSP scenario, UC's PCP would also consist of 105% eligible renewable generation in 2035, which again meaningfully exceeds the 60% target.

Enable Each Electrical Corporation to Fulfill Its Obligation to Serve Customers at Just and Reasonable Rates

As discussed below, UC's model does not lend itself to considerations of just and reasonable rates to its participating campuses in the traditional sense. However, UC nevertheless aims to minimize program costs on behalf of participating campuses and manage volatility through balanced and diverse portfolios.

Minimizing Bill Impact

The operating model for UC's CPP is self-procurement on behalf of participating campuses, since they are all part of The Regents of the University of California. As such, UC does not provide generation service to traditional customers, and UC's procurement does not have a direct impact on ratepayers. As a general matter, cost-effectiveness was one of the considerations used by UC to select resources for its PCP. UC's PCP also includes investments in emerging technologies, such as battery storage. These investments will contribute to further development

[10] See D.22-02-004 at 105.

of the market for these technologies, allowing them to achieve greater economies of scale and continuing the trend of less expensive and more effective renewable resources and energy storage solutions. This investment should also contribute, at least indirectly, to reducing costs for California's energy consumers.

Ensuring System and Local Reliability

UC's PCP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(E) goal of ensuring system and local reliability. The PCP meets system resource adequacy requirements as detailed in Section II. With the adoption of the Central Procurement Entity structure, UC no longer has local resource adequacy requirements in the Pacific Gas and Electric ("PG&E") and Southern California Edison Company ("SCE") service areas, since the CPEs have taken over the procurement of local resource adequacy capacity within these areas. UC continues to procure local resource adequacy capacity as required within the San Diego Gas & Electric Company ("SDG&E") service area. The CPE construct has only recently become operational. UC's portfolio assumes CAM allocations, which incorporate CPE system and flexible capacity allocations, consistent with what is described in the most recently issued CPE procurement allocations. UC anticipates that this will reduce UC's system requirement in the near-term by approximately 6%.

Ensure that at least 65% of RPS Procurement is From Long-Term Contracts

Consistent with Section 454.52(a)(1)(F), UC's PCP is on pace to meet the requirement that 65% of its Renewables Portfolio Standards ("RPS") procurement must come from contracts of 10 years (long-term) or more for each compliance period. For the current compliance period UC has procured sufficient energy from long-term contracts to exceed the 65% requirement. Notably, UC elected early compliance with the long-term contracting requirement pursuant to D.17-06-026 and has built a significant balance of bankable long-term PCC1 RECs from Compliance Period 3 that may be carried forward into Compliance Period 4.

Strengthen the diversity, sustainability, and resilience of the bulk transmission and distribution systems, and local communities

UC's PCP achieves results and performance characteristics that strengthen the diversity, sustainability and resilience of the bulk transmission and distribution systems, as well as local communities, meeting Section 454.52(a)(1)(G). UC's PCP relies on procurement from a variety of resource types including storage resources. UC evaluates the long-term generation load-matching and congestion risks of new resources and weighs its options in the context of its existing supply and net demand on an hourly basis for the full duration of any contract period.

As described below, UC is actively pursuing the procurement of capacity to meet the sub-category requirements of D.21-06-035, which includes long-duration storage, clean-firm resources like geothermal, and resources to replace the Diablo Canyon Power Plant. These resources will provide added diversity and resilience to the grid, as well as UC's PCP.

Demand-Side Energy Management

UC's PCP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(G) goal of enhancing demand-side energy management. UC campuses have extensive energy infrastructure that provides opportunities to shift load and, in some cases, even

export electricity. The California Energy Commission and the state's executive leadership is well aware of this, and the Governor's office routinely contacts UC to request emergency grid support during extreme heat events. The California Energy Commission has been working with UC to identify opportunities for additional grid support during emergency heat events expected in the coming years, incremental to ramping down use of HVAC and lighting on campuses. Options include expansion and optimization of thermal energy storage resources on campuses, along with providing ancillary grid support from other campus generation and storage resources including batteries, cogeneration facilities and backup generation units in situations with extreme supply shortfall. UC campuses cooperate to provide emergency support, where feasible, including ongoing participation in IOU demand response ("DR") programs such as the Emergency Load Reduction Program ("ELRP"), and working with DR aggregators to provide resource adequacy and other grid support. In addition, UC's cost allocation methodology provides built-in incentives for campuses to shift energy use from hours when wholesale market prices are high to when they are low. Information on recent hourly price trends is provided on a regular basis to participating campuses, in both numerical and graphic formats, to inform such behavior.

Minimizing Localized Air Pollutants with Emphasis on Disadvantaged Communities ("DACs")

UC's PCP achieves results and performance characteristics consistent with the Section 454.52(a)(1)(l) goal of minimizing localized air pollutants and other GHG emissions with early priority on disadvantaged communities. UC's PCP relies primarily on renewable generation and hydroelectric generation, and this portfolio is expected to exhibit very low GHGs and localized air pollution emissions. UC's PCP minimizes UC's reliance on unspecified system power, which may include power from generators within DACs, instead opting for renewable generation development and carbon free procurement options whenever feasible.

Results from the 30 MMT CSP calculator indicate the following localized air pollutants associated with UC's PCP in 2035:

- NOx: 0.98 tonnes/year
- PM 2.5: 0.19 tonnes/year
- SO2: 0.02 tonnes/year

Results from the 25 MMT CSP Calculator indicate the following localized air pollutants associated with UC's PCP in 2035:

- NOx: 0.76 tonnes/year
- PM 2.5: 0.18 tonnes/year
- SO2: 0.02 tonnes/year

These emissions are expected to result from the planned use of system energy in the 30 MMT and 25 MMT CSP scenarios. UC has no current plans to procure biomass energy, but to the extent that future all-source renewable energy solicitations yield cost-competitive biomass project options, UC would prioritize those located outside of DACs to the greatest practical extent.

c. GHG Emissions Results

UC used its load-based proportional share of the 30 and 25 MMT GHG Benchmarks to determine the emissions compliance for its PCP in both the 30 MMT and 25 MMT scenarios. UC's assigned load-based proportional share of the 30 MMT benchmark is [redacted] in 2030 and [redacted] in 2035. Based on the 30 MMT version of the CSP calculator, UC's PCP would result in total 2030 GHG emissions of -0.0045 MMT and 2035 GHG emissions of 0.0061 MMT, which is less than UC's assigned load-proportional share of the 30 MMT GHG reduction benchmarks.

UC's assigned load-proportional share of the 25 MMT GHG Benchmarks in 2030 is [redacted] MMT and [redacted] in 2035. Based on the 25 MMT version of the CSP calculator, UC's PCP would result in total 2030 GHG emissions of -0.0051 MMT and 2035 GHG emissions of 0.0043 MMT, which is less than UC's assigned load-proportional share of the 25 MMT GHG reduction benchmarks.

d. Local Air Pollutant Minimization and Disadvantaged Communities

i. Local Air Pollutants

The 30 MMT version of the CSP calculator estimates the following emissions associated with UC's PCP in tonnes per year:

Table 5: 30 MMT Conforming Portfolio Air Pollutants

	2024	2026	2030	2035
NOx	6.82	3.99	1.75	0.98
SO_2	0.38	0.16	0.00	0.02
PM2.5	3.96	1.61	-0.13	0.19

The 25 MMT version of the CSP calculator estimates the following emissions associated with UC's PCP in tonnes per year:

Table 6: 25 MMT Conforming Portfolio Air Pollutants

	2024	2026	2030	2035
NOx	6.79	3.90	1.63	0.76
SO_2	0.38	0.16	0.01	0.02
PM2.5	3.95	1.58	0.06	0.18

UC's contribution to air pollutants is exclusively a result of reliance on system power. The tables below show the portion of load that is being served from system power each year for the respective portfolios.

Table 7: 30 MMT Conforming Portfolio Demand and System Power

	2024	2026	2030	2035
Demand (at generator bus bar)				
Net System Power				
% of Load Served by System Power	49.5%	14.4%	0.0%	1.1%

Table 8: 25 MMT Conforming Portfolio Demand and System Power

	2024	2026	2030	2035
Demand (at generator bus bar)				
Net System Power				
% of Load Served by System Power	49.7%	14.9%	0.0%	0.7%

UC discusses its plans to continue reducing reliance on system power in Section IV Action Plan.

ii. Focus on Disadvantaged Communities

UC's IRP and PCP are consistent with the goal of minimizing local air pollutants, with early priority on Disadvantaged Communities ("DACs"). As defined by the CalEPA's designation in CalEnviroScreen 4.0, DACs include four categories:

- Census tracts receiving the highest 25 percent of overall scores in CalEnviroScreen 4.0 (1,984 tracts).
- Census tracts lacking overall scores in CalEnviroScreen 4.0 due to data gaps but receiving the highest 5 percent of CalEnviroScreen 4.0 cumulative pollution burden scores (19 tracts).
- Census tracts identified in the 2017 DAC designation as disadvantaged, regardless of their scores in CalEnviroScreen 4.0 (307 tracts).
- Lands under the control of federally recognized Tribes.

As discussed previously, UC provides electricity service to UC campuses and facilities only, and as such does not serve ratepayers in a traditional sense – including customers in DACs. However, UC recognizes that its campuses and facilities are integral parts of their surrounding communities and has identified the following DACs that include a UC-generation-receiving campus of facility within their borders or directly adjacent to such a campus of facility.

Table 9: Census Tracts within DAC Territories

Census Tract	Zip Code	CalEnviroScreen 4.0 Score	City, County	Population	DA Customer Accounts
6001401300	94705	80	Berkeley, Alameda	3,921	2
6001403000	94607	91	Oakland, Alameda	2,905	6
6013380000	94804	75	Richmond, Contra Costa	5,931	5
6019006802	93648	98	Parlier, Fresno	3,339	11
6019007802	93624	85	Five Points, Fresno	5,354	4
6019008502	93648	94	Parlier, Fresno	9,242	2
6037701801	90404	85	Santa Monica, Los Angeles	7,001	4
6059076204	92701	76	Santa Ana, Orange	4,639	1
6065046700	92518	98	Riverside, Riverside	4,721	1
6075980600	94124	83	San Francisco, San Francisco	690	1
6081602300	94080	83	South San Francisco, San Mateo	4,196	4
6107002400	93274	79	Tulare, Tulare	14,401	1
6113010203	95691	96	West Sacramento, Yolo	5,355	1

In total, 6.6% of DA electric accounts served by UC, representing 3% of CPP annual load, are located within DACs. The specific campuses and facilities include, but are not limited to:

- UC Merced – Main Campus
- UC Office of the President – Headquarters
- UC San Francisco – Mission Bay, Hunter's Point and So. San Francisco
- UCLA Los Angeles – Santa Monica Clinic
- Agriculture & Natural Resources – Southcoast and Kearny

UC is dedicated to reducing pollution impacts and encouraging the development, health, and prosperity of DACs both within and outside its service area. UC's Clean Power Program procurement and related policies and programs support DACs in five distinct ways.

- Avoiding and reducing pollution impacts in DACs by not contracting with gas generators, whether located in DACs or elsewhere, and reducing reliance on system power over time
- Prioritizing procurement of clean generation resources that have strong community support and promote positive economic and envitonmental impacts in DACs
- Thoughtful consideration of how best to incorporate environmental justice issues into the overall context of diversity, equity and inclusion, as reflected in UC policies and action plans

- Funding IOU programs that support economic development and pollution reduction in disadvantaged communities, through the payment of Commission-approved non-bypassable charges
- By generating energy cost savings and environmental benefits across the UC system, UC's Clean Power Program supports the UC's overall educational and research goals.

Supporting UC's educational and research goals by providing low carbon electricity to meet operational needs may be the most impactful mechanism identified above. The UC system is California's largest and most significant engine for socio-economic mobility. UC consistently admits – and graduates - more first-generation students than other institution of its caliber, and more than half of its California undergraduates pay no tuition. The UC system's approximate$5 billion annual research and innovation budget represents nearly one tenth of all academic research conducted in the United States. Many of the environmental technologies and climate adaptation strategies being studied by UC today will help to reduce emissions and DAC pollution impacts tomorrow.

Power Procurement in DACs

UC does not currently procure electricity directly from any natural gas or other fossil fuel power plants. UC's PCP seeks to minimize the use of unspecified system power, reducing potential indirect reliance on gas generators that have a disproportionate impact on DACs. Based on the CSP results for both 30 MMT and 25 MMT, UC does not rely on system power in 2030, which represents a reduction of 25% since the 2020 IRP was prepared and submitted. UC's projected reliance on system power is expected to decrease significantly between now and 2035 due to the addition of incremental renewable and battery storage resources over time.

UC's IRP procurement reflects its preference for clean generation resources located within or near DACs that will drive positive economic and environmental impacts in these DACs. UC incorporates qualitative evaluation criteria into its bid solicitation protocols covering topics such as corporate social responsibility policies of the counterparty and response from the community and local government to the proposed project. One of UC's existing long-term power purchase agreement with a solar facility located in a DAC. The presence of solar generation in such a community may help to support the local economy and reduce the local pollution burden.

In becoming an ESP, it was not UC's intent - nor would it be appropriate from an organizational perspective - for Clean Power Program staff to duplicate or replace campus-driven community engagement efforts. In its ESP role, UC primarily relies on prospective project developers to conduct appropriate project siting analysis and community engagement. This aligns well with UC's procurement guidelines, which require that all competitive solicitations allocate 15% of the points utilized to sustainability criteria, including for socially and economically responsible items.

UC is also actively considering how best to incorporate environmental justice issues into the overall context of diversity, equity and inclusion. This consideration is being guided by two key documents – the Commission's Environmental and Social Justice Action Plan, and the University of California's Framework for Incorporating Environmental & Climate Justice into

Climate Action. UC expects this consideration to result in the development of policies and strategies to help guide future procurement.

While UC strives to reduce its dependence on resources that emit GHGs and other local pollutants, UC must also balance that goal against reliability and affordability, which is what UC has strived to do in its Preferred Conforming Portfolio.

LSE Activities and Programs Impacting DACs

UC has endeavored to center equity as it has invested in comprehensive and rigorous strategies to decarbonize, such as the Clean Power Program. UC recently launched the UC Center for Climate Justice, one of the first university-based institutions dedicated to equitable climate action in the country, and the UC Center for Climate, Health and Equity, which will advance equitable and just climate solutions that promote human health. These hubs will accelerate critical research at the intersection of climate change, social justice and health inequities. In addition, seven of UC's campuses are working in partnership with the Office of the Governor on its California Volunteers College Corps, which is a first of hits kind initiative. Over the next four years, partner campuses will deploy 10,000 College Corps Fellows to tackle statewide challenges, with the goals of creating a generation of civic-minded leaders, helping low-income students graduate college on time with less debe, and addressing societal challenges to help build more equitable communities across California.

e. Cost and Rate Analysis

UC's PCP is expected to be reasonable from a cost perspective. In selecting resources for its conforming portfolios, UC carefully considered the cost implications of specific resource selections and procurement timing. This analysis was informed by UC's procurement experience and the standard assumptions and results of the Commission's RESOLVE/SERVM modeling. UC's procurement cycle is designed to take advantage of technological and cost improvements by incrementally adding new resource commitments over time.

f. System Reliability Analysis

UC's conforming portfolios are expected to be reliable and will contribute UC's fair share to system reliability needs.

UC 30 MMT Conforming Portfolio

The effective capacity of UC's 30 MMT conforming portfolio is provided in the following "Reliability" tab from the 30 MMT Resource Data Template. The net qualifying capacity for the month of September is shown for each year in Table 10:

Table 10: System Reliability Progress Tracking, September, 30 MMT Portfolio

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
hybrid	Online												
utility_pv	Online												
4hr_batteries	Online												
demand_response	Online												
gas_cc	Online												
gas_ct	Online												
cogen	Online												
utility_pv	Development												
btm_pv	Development												
4hr_batteries	Development												
6hr_batteries	Development												
cogen	Development												
in_state_wind_south	PlannedNew												
out_of_state_wind_AZNM	PlannedNew												
4hr_batteries	PlannedNew												
pumped_storage	PlannedNew												
demand_response	PlannedNew												
geothermal	PlannedNew												
LSE total supply (effective MW)													

Figure 1: UC's Portfolio Capacity by Resource Type, 30 MMT Portfolio

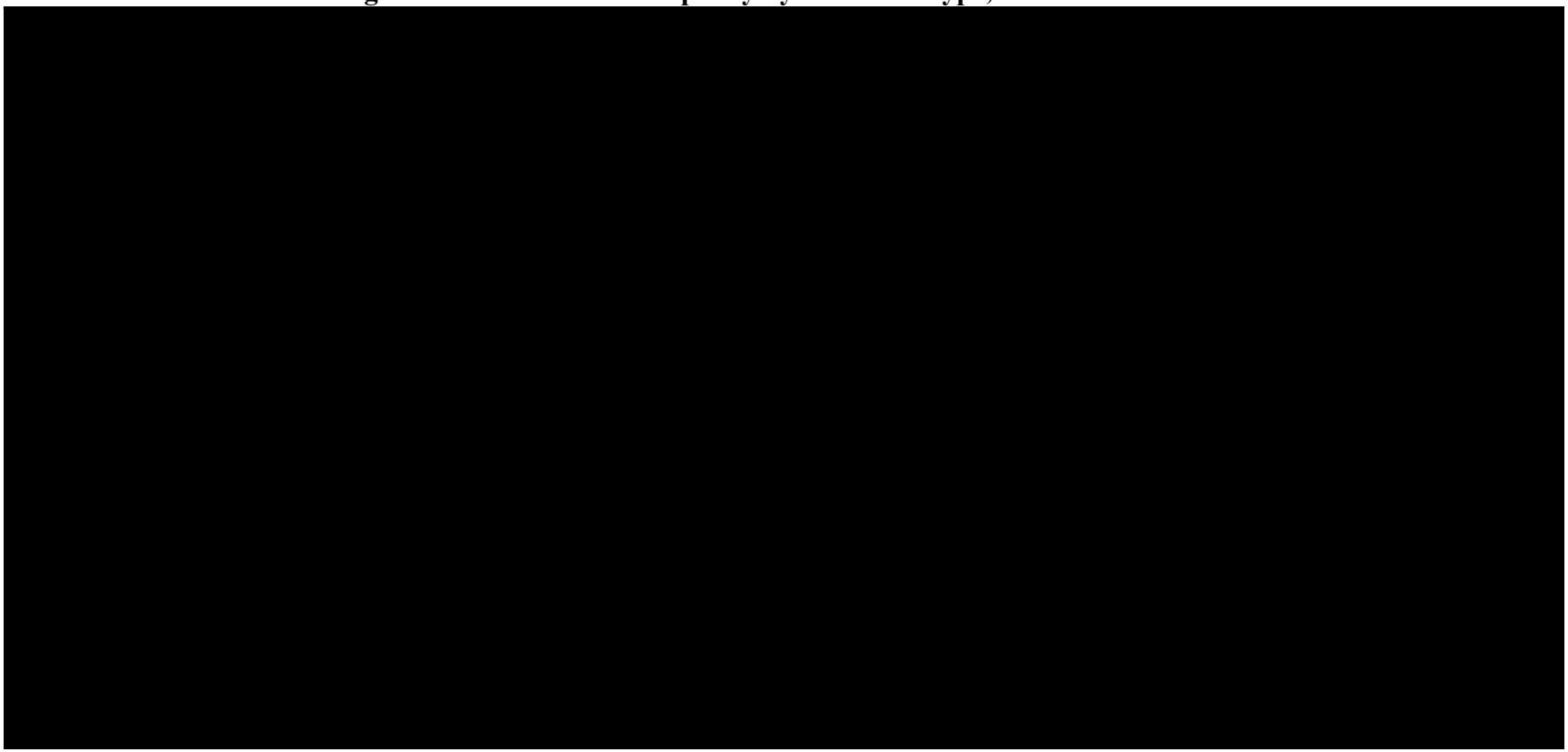
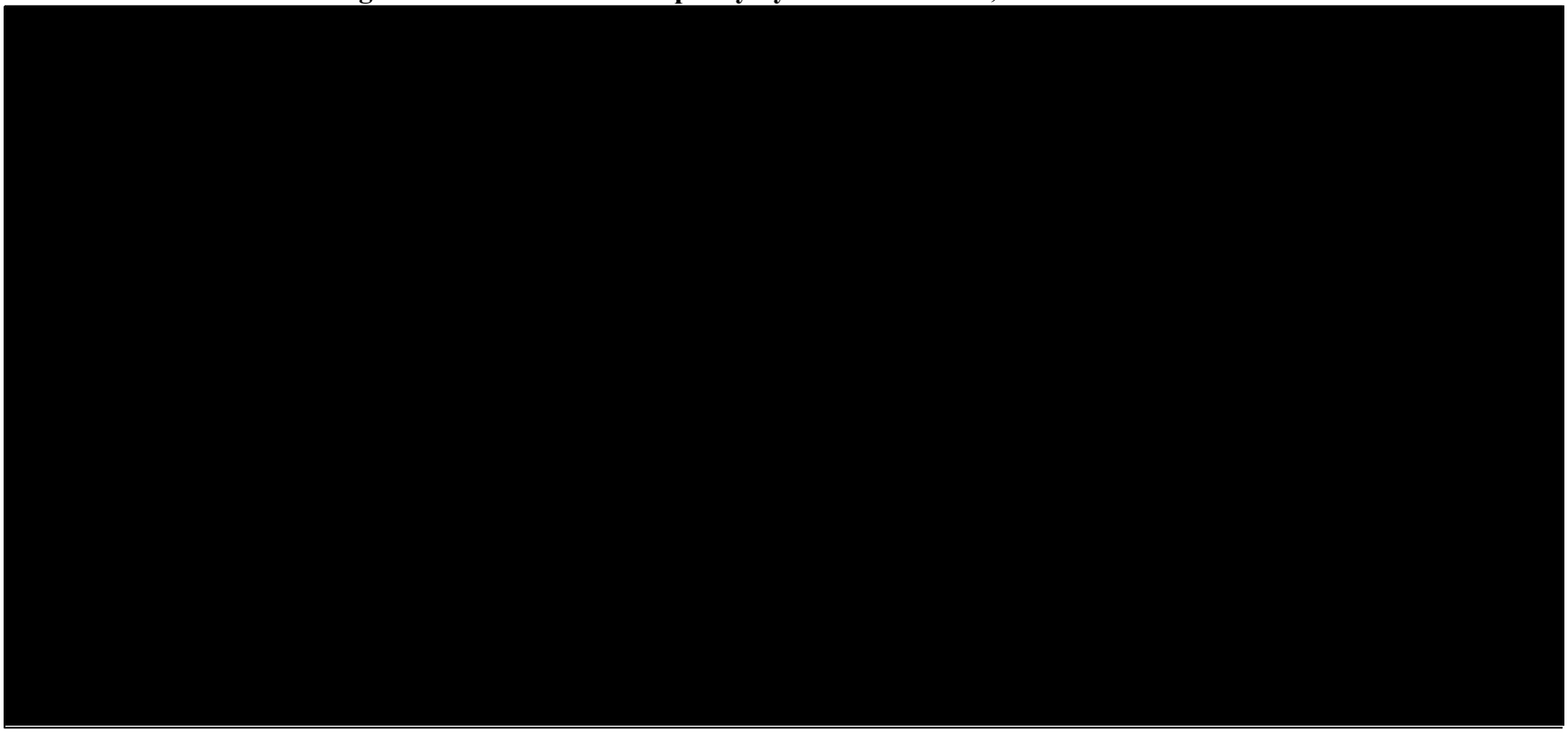


Figure 2: UC's Portfolio Capacity by Contract Status, 30 MMT Portfolio



As demonstrated in Table 10, UC's 30 MMT conforming portfolio contributes [redacted] MW of peak monthly NQC in 2035. While not shown in the table above, this NQC exceeds UC's peak load plus the 14% PRM. Of this total, [redacted] MW are related to new renewable and hybrid resources as well as new short- and long-duration storage resources. UC's 30 MMT conforming portfolio includes planned contracts with existing resources for a total of [redacted] MW of NQC. This high level of reliability demonstrates that UC's preferred resource selections work together to effectively and reliability integrate a renewables-heavy portfolio, thus meeting and exceeding UC's share of any systemwide renewable integration resource requirement. To confirm the reliability of its 30 MMT Portfolio, UC reviewed the Reliability tab of the Resource Data Template to ensure that the supply minus load equals zero for the month when annual peak load is typically observed. Figure 1 above shows UC's 30 MMT portfolio broken down by resource type and demonstrates that UC meets its reliability obligation from 2024 through 2035. Figure 2 also provides information about the contract statuses of resources that compose the 30 MMT portfolio.

UC 25 MMT Conforming Portfolio

The effective capacity of UC's 25 MMT conforming portfolio is provided in the following "System Reliability Progress Tracking Table" from the 25 MMT Resource Data Template. The net qualifying capacity for the month of September is shown for each year in Table 11:

Table 11: System Reliability Progress Tracking, September, 25 MMT Portfolio

Resource Type	Contract Status	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
hybrid	Online												
utility_pv	Online												
4hr_batteries	Online												
demand_response	Online												
gas_cc	Online												
gas_ct	Online												
cogen	Online												
utility_pv	Development												
4hr_batteries	Development												
6hr_batteries	Development												
cogen	Development												
in_state_wind_south	PlannedNew												
out_of_state_wind_AZNM	PlannedNew												
4hr_batteries	PlannedNew												
pumped_storage	PlannedNew												
demand_response	PlannedNew												
geothermal	PlannedNew												
LSE total supply (effective MW)													

Figure 3: UC's Portfolio Capacity by Resource Type, 25 MMT Portfolio

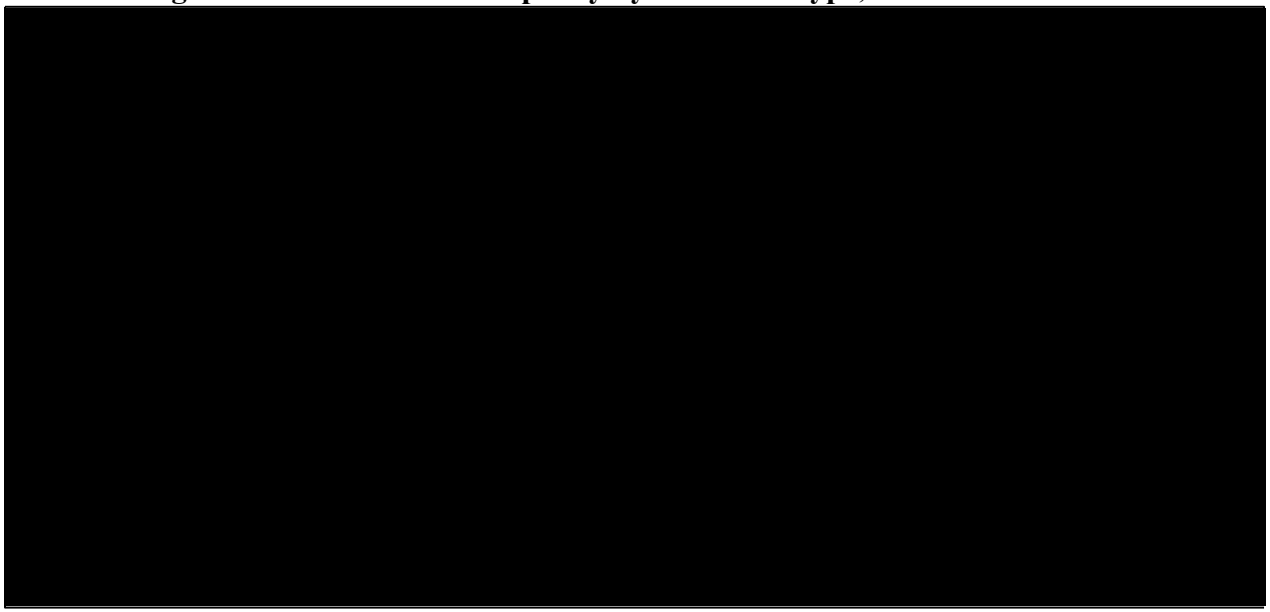
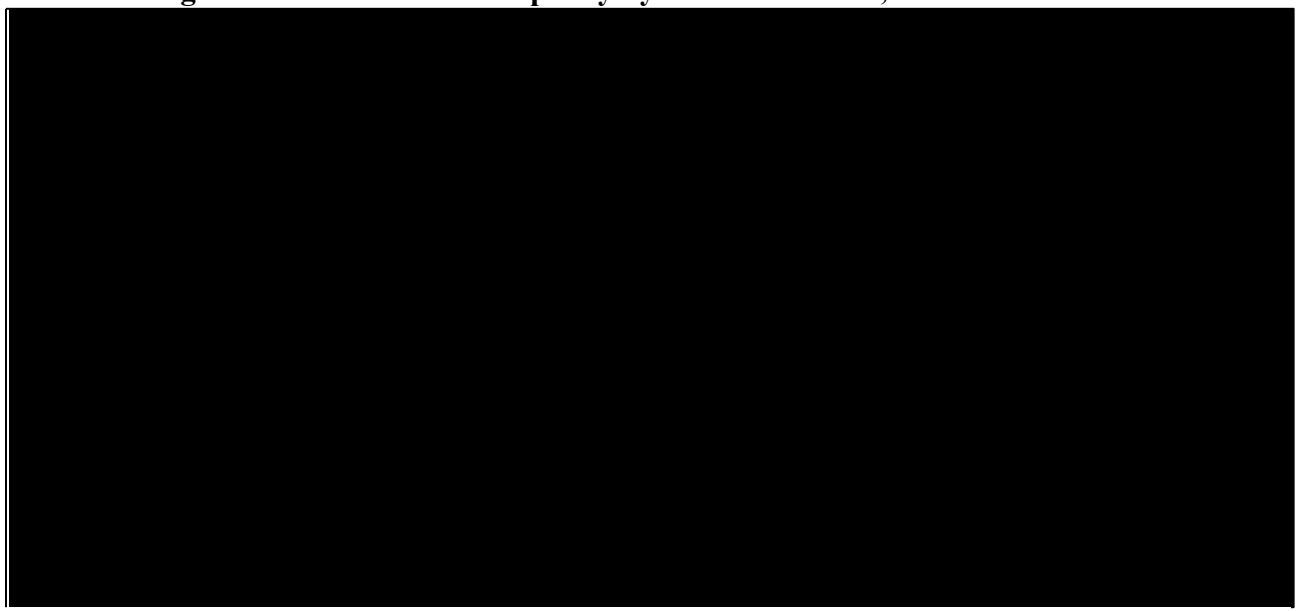


Figure 4: UC's Portfolio Capacity by Contract Status, 25 MMT Portfolio



As demonstrated in Table 11, UC's 25 MMT PCP contributes [redacted] MW of peak monthly NQC in 2035. While not shown in the table above, this NQC exceeds UC's peak load plus the 14% PRM. Of this total, [redacted] MW are related to new renewable and hybrid resources as well as new short- and long-duration storage resources. UC's 25 MMT portfolio includes planned contracts with existing resources for a total of [redacted] MW of NQC. This high level of reliability demonstrates that UC's preferred resource selections work together to effectively and reliability integrate a renewables-heavy portfolio, thus meeting and exceeding UC's share of any systemwide renewable integration resource requirement. To confirm the reliability of its 25 MMT portfolio, UC reviewed the Reliability tab of the Resource Data Template to ensure that the supply minus load equals zero for the month when annual peak load is typically observed. Figure 3 above shows UC's 25 MMT portfolio broken down by resource type and demonstrates that UC meets its reliability obligation from 2024 through 2035. Figure 4 provides information about the contract statuses of resources that compose the 25 MMT portfolio.

g. High Electrification Planning

Under the Commission's High Electrification ("HE") TPP case, the increase in loads remain small through 2030. System peak load in 2030 under the HE TPP case is only 1.5% higher than in the standard case, and the load is only 3.7% higher. For UC, this translates into an additional [redacted] By 2035, peak load is [redacted]. In 2045, peak load is estimated to be 20.2% higher and load is estimated to be 21.5% higher. Because these increases in the near future are small, and UCs PCP is expected to exceed its proportional share of emissions reductions within the planning horizon, UC expects it will have time to see how the high electrification situation impacts load before deciding on any additional procurement.

h. Existing Resource Planning

UC's PCP shows declining use of existing resources as UC plans to work with developers to add new renewable generation to the UC power mix. As demonstrated in UC's PCP, UC will drive significant new resource development, which will have a corresponding decrease in UC's planned use of existing resources. About 72% of UC's planned renewable energy purchases for this IRP planning horizon are from yet-to-be built projects.

Compared to UC's 2020 IRP, planned reliance on existing resources in 2030 has declined from 49.7% to 28%. These existing resources include renewable resources that are already online and under contract, expected allocations of CAM resources from the IOU portfolios, and expected resource adequacy contracts with existing generators. The only source of existing resource procurement that has been added since UC's 2020 IRP is an estimate of the GHG-free allocations from PG&E and SCE that were made available to LSEs starting in mid-2020. UC's current PCP shows a progression from 86% reliance on existing resources in 2024 to 28% reliance on existing resources in 2035.

Existing resources that UC plans to utilize are generally resources that have been available and successfully contracted with in the past. Some of these contracts are for multi-year terms, which

provides some assurance that such resources will remain available. UC has chosen these resources in part due to their lower delivery risks compared to new resources. However, UC recognizes that there is a risk that some existing resources planned for use may ultimately not be available to meet UC's plans. UC's portfolios attempt to balance out these competing risks, and UC will adapt its plans should energy market conditions change.

i. Hydro Generation Risk Management

In developing its portfolios, UC seeks to manage the risk of reduced hydro availability that may result from future in-state drought primarily by not procuring any additional hydroelectric resources compared to what was already under contract as of UC's 2020 IRP.

UC's 2022 PCP differs from the 2021 PSP Portfolio through the inclusion of a small WAPA base resource contract, along with GHG-free and CAM allocations from the state IOUs. UC has strived to procure additional renewable energy and battery storage capacity in order to minimize its dependence on hydro generation, which has been significantly impacted by ongoing statewide drought conditions. Including the estimates of hydro production related to PG&E and SCE's GHG-free allocation programs, hydroelectric power still represents less than 3% of UC's PCP supply portfolio in 2035. UC's expected costs, GHG emissions, and reliability are largely unaffected by in-state drought due to UC's minimal reliance on hydroelectric generation. To the extent that hydro supply is unavailable, UC would plan to use other sources of low carbon or carbon-free energy, which could include additional RPS-eligible renewable energy.

j. Long-Duration Storage Planning

The Commission's PSP included 1,000 MW of new long-duration storage to be operational by 2028. UC's first solicitation aimed at procuring resources to meet the mid-term reliability requirements pursuant to D.21-06-035 did not yield any project proposals consistent with the requirements of the Long Lead Time Capacity tranche. UC has begun discussion with other LSEs about the possibility of procuring jointly or for a portion of already-contracted resources, since long-duration storage projects are typically implemented a scale that vastly exceeds UC's procurement requirement of [redacted]. UC plans to continue these discussions, as well as issuing additional solicitation(s) as needed to procure long-duration storage.

UC's experience thus far in attempting to procure long-duration storage resources is that very few developers are able to meet the current demand within timeframes required by D.21-06-035, but UC believes that technological advancement and scale manufacturing will eventually provide opportunities for greater use of long-duration storage. As additional technologies are market-proven and more developers offer long-duration storage, UC will consider further procurement of these resources. UC sees the possibility for substantial benefits from long-duration storage to the grid and for aiding LSEs in compliance with the Commission's Slice-of-Day reforms to the RA program.

k. Clean Firm Power Planning

The Commission's PSP included 1,000 MW of "clean firm" power by 2035. UC's first solicitation aimed at procuring resources to meet the mid-term reliability requirements pursuant to D.21-06-035 did not yield any project proposals consistent with the requirements of the Long Lead Time Capacity tranche. UC has begun discussion with other LSEs about the possibility of procuring jointly or for a portion of already-contracted resources, since geothermal projects are typically implemented a scale that vastly exceeds UC's procurement requirement of [redacted]. UC plans to continue these discussions, as well as issuing additional solicitation(s) as needed to procure clean firm power.

Unfortunately, supply of clean firm resources generally, and geothermal in particular, is very limited in California, and the cost of new-build resources is high. Clean firm energy imported from other balancing areas is complicated by transmission availability and the need to obtain equivalent Maximum Import Capability ("MIC") through the CAISO in order to utilize the capacity under the resource adequacy program. Despite these challenges to their expanded use, clean firm resources are important contributors to reliability and offer operational attributes that cannot be replicated by current-technology storage or other resource types.

l. Out-of-State Wind Planning

The Commission's Preferred System Plan calls for 4,636 MW of new out-of-state wind generation ("OOS Wind") to be developed and operational by 2035. UC's proportional share of this would be approximately [redacted], and UC's PCPs include 85 MW of OOS Wind. UC understands that the transmission projects needed to connect OOS Wind to the CAISO grid require significant lead-times. UC is currently in negotiations with an OOS Wind developer that is also building and securing the transmission needed to deliver necessary wind energy directly to California from New Mexico. Therefore, UC has reflected OOS Wind in both of its portfolios.

m. Offshore Wind Planning

The Commission's PSP calls for 4,704 MW of new offshore wind generation to be developed and operational by 2035. UC's proportional share of this would be approximately [redacted]. California currently has little experience with offshore wind development. Although expected to provide benefits in comparison to existing wind resources, it is unclear what exact resource and reliability benefits offshore wind may provide and at what cost. For this reason, and because of the significant expected procurement of OOS wind resources (85 MW), UC has not included any offshore wind procurement in its PCP.

n. Transmission Planning

In identifying resource locations for all portfolios, UC was guided by the following considerations:

- UC prefers projects located in areas that can utilize existing transmission infrastructure with minimal upgrade/modification costs.
- UC prefers low-impact renewable energy projects that provide economic benefit to DACs, subject to community interest in siting projects within such locations.

Unlike the IOUs, UC is not a transmission and distribution ("T&D") system operator. UC does not enjoy the benefits of a granular knowledge of the IOU T&D systems, and UC is not in the best position to identify optimal resource locations. In practice, UC relies on project developers to conduct the research and technical studies necessary for siting potential generation projects. UC evaluates projects offered by developers based on a variety of criteria, including transmission availability, nodal prices and potential for congestion, project viability, environmental, workforce, and other factors. As such, UC generally utilized the PSP selected candidate resources as a guide for likely resource locations in its 2022 PCP. These should be treated as general expectations based on the aforementioned considerations, not definitive selections – actual project locations will be selected during UC's future solicitation processes. UC believes that the best way to keep costs down during resource solicitations is to not limit the potential locations of the resources. Competition among the responders to resource solicitations ensures that UC can avail itself of the best possible resources, including allowing developers to explore different locations and select what they feel is the best location for their resource taking into account numerous factors, including the costs of any potential transmission upgrades or curtailment issues. Like most LSEs, UC does not have the necessary resources to examine all possible resource locations to find optimal ones from a transmission perspective but relies on the developers of projects doing just that.

As discussed in prior sections, UC will remain flexible with respect to identifying specific resources for its supply portfolio. If UC's expected resource locations become infeasible due to various constraints, or if the Commission's modeling efforts happen to indicate that certain resource locations are no longer feasible/desirable, then UC would ultimately locate and contract for alternative resources that fall in preferred locations. UC also remains open to attractive project opportunities in locations identified by developers, even if these locations differ from the assumptions used in this plan.

Several of the resources in UC's PCP are currently expected to require transmission upgrades beyond the standard interconnection process. Those resources in UC's PCP that might require substantial transmission upgrades or new transmission lines include those identified as new solar and New Mexico Wind. The former encountered interconnection delays after UC entered an agreement with them, and UC is actively renegotiating the COD in conjunction with adding battery storage to the project. UC's choice of New Mexico Wind was made because of the existing plans for transmission to bring that energy to California. When selecting future resources for its portfolios UC will considered transmission and choose projects for which any transmission concerns can be minimized or are already addressed.

UC's 2022 PCP includes a total of 182 MW of new resources to be built at the locations identified in UC's 25 and 30 MMT RDTs. The following table provides a list of these resources, their identified locations, and UC's preferred alternate locations if the Commission's modeling finds that the selected locations are not feasible.

Table 12: New Resources PCP

New Resource	Size	Selected Location	Preferred Alternative Locations
Utility Solar	45 MW	Tehachapi	NA- under contract
[redacted]	[redacted]	[redacted]	[redacted]
OOS Wind	85 MW	New Mexico	NA – under negotiation
Wind	20 MW	Kern County, CA	NA – under negotiation
Geothermal (capacity only)	[redacted]	TBD	
Long Duration Energy Storage (capacity only)	[redacted]	TBD	

IV. Action Plan

a. Proposed Procurement Activities and Potential Barriers

UC will continue to evaluate its actual needs related to renewable and carbon-free generation that both (a) meet RPS standards and other applicable requirements, and (b) support UC's system-wide policies and carbon neutrality goals. To the extent that additional resources are needed, UC will conduct future solicitations (both formal and informal, depending on factors such as product type, cost, term and overall risk profile) to fulfill such needs. Currently ongoing procurement efforts include negotiations pursuant to both UC's 2021 renewable energy solicitation, and the request for proposals for mid-term reliability resources conducted on UC's behalf by The Energy Authority (who provides scheduling coordinator and portfolio management services to UC).

UC has a well-established procurement process that it will use to steadily achieve its PCP over the next ten to fifteen years (i.e., by 2035). UC's procurement process includes the following key activities:

- Identification of planned resources by type, desired online date, and capacity.
- Planning for procurement activities in consideration of UC's risk management guidance and business practices; resource acquisition lead times including, where applicable, development timelines; staff capacity; and financial considerations.
- Design and administration of resource solicitations. For new resources, these typically take the form of periodic request for offers processes, while for existing resources, procurement activity is more frequent and routinized.
- Careful negotiation of contract terms to ensure positive outcomes for UC program participants with appropriate risk mitigation.
- Ongoing contract management, including where applicable, careful monitoring of development milestones.
- Ongoing contract management, including where applicable, careful monitoring of generator performance after a resource has achieved commercial operation date ("COD").

UC's 2021 solicitation was open to bids from all RPS-eligible (Portfolio Content Category 1) technologies and was aimed at procuring renewable energy for all UC campuses, not limited to the needs to UC in its role as an ESP. Examples of UC's efforts to diversify its resource mix and reduce reliance on system power include selection of two wind projects as part of its 2021 renewables solicitation, [redacted] and current negotiation of shortlisted battery storage and demand response projects resulting from UC's mid-term reliability solicitation. All executed contracts will be incorporated into subsequent IRP cycles and other CPUC reporting requirements. UC plans to conduct further solicitations on an as-needed basis going forward.

i. Resources to meet D.19-11-016 procurement requirements

UC expects to meet its D.19-11-016 procurement requirements. For tranches 1, 2, and part of 3 UC is meeting its requirements with a currently operational solar project under long term contract. For the remainder of tranche 3, UC has executed a Resource Adequacy only contract for a portion of the capacity from an incremental solar resource that is currently under construction. At this time, UC does not expect there to be any barriers to meeting these requirements.

ii. Resources to meet D.21-06-035 procurement requirements, including:

a. 1,000 MW of firm zero-emitting resource requirements

UC's required portion of firm zero-emitting resources under D.21-06-035 is [redacted]. While UC's first solicitation aimed at procuring resources to meet the Mid-Term Reliability requirements did not yield any project proposals consistent with the requirements of the Long Lead Time Capacity tranche, UC intends to hold another solicitation in late 2022 or early 2023. UC will also continue discussions with other LSEs about the possibility of procuring jointly or for a portion of already-contracted resources, since firm zero-emitting resource projects are typically implemented a scale that vastly exceeds UC's procurement requirement of [redacted]

b. 1,000 MW of long-duration storage resource requirements

UC's required portion of long-duration storage resources under D.21-06-035 is [redacted]. While UC's first solicitation aimed at procuring resources to meet the Mid-Term Reliability requirements did not yield any project proposals consistent with the requirements of the Long Lead Time Capacity tranche, UC intends to hold another solicitation in late 2022 or early 2023. UC will also continue discussions with other LSEs about the possibility of procuring jointly or for a portion of already-contracted resources, since long-duration storage projects are typically implemented a scale that vastly exceeds UC's procurement requirement of [redacted]. UC also recognizes that the potential for development of long duration storage, such as pumped storage resources, are inherently limited by a limited number of viable project sites, long lead times, and relatively high up-front capital costs. Given these limitations and the procurement timelines in question, UC believes that collaborative, multi-buyer approaches to pumped storage are the best approach to increase the likelihood of development and procurement of these resources.

c. 2,500 MW of zero-emissions generation, generation paired with storage, or demand response resource requirements

UC's required portion of zero-emissions generation, generation paired with storage, or demand response resources is [redacted]. UC is planning to fulfill this requirement through a [redacted] BTM demand response resource.

d. All other procurement requirements

UC's overall D.21-06-035 requirement, excluding the previously discussed sub-category requirements, is [redacted]. UC is planning to fulfill this requirement through two [redacted] planned-new battery storage resource projects.

iii. Offshore wind

UC understands and appreciates the value that offshore wind can provide to the state of California, especially considering the vast resource that exists along the Pacific Coast and is following the development of these resources. However, leases for the offshore locations have not been issued so projects remain somewhat speculative. UC looks forward to considering offshore wind project proposals in future solicitations.

iv. Out-of-state wind

UC understands and appreciates the value that out of state wind resources represent; the potentially excellent wind production capability and production profiles that are complementary to California's solar-driven "duck curve."

As mentioned above, UC is currently in negotiations with a developer pursuant to its 2021 renewable energy solicitation for 85 MW of New Mexico Wind, with an anticipated COD of mid-2026. UC's choice of New Mexico Wind was made in large part because of the existing plans and demonstrated progress for transmission to bring that energy to California.

v. Other renewable energy not described above

The UC system in general has more than 100 renewable energy facilities online, including both onsite and offsite installations. Through these resources and Clean Power Program electricity, UC uses more voluntary renewable electricity than any other college of university participating in the EPA's Green Power Partnership program and ranks seventh in onsite green power generation compared to all corporations and governments, trailing only entities like Apple and Walmart. These rankings are even more impressive considering that, as a regulated LSE, UC must exclude renewable energy used to comply with RPS standards, from its reported volumes.

vi. Other energy storage not described above

[redacted]

vii. Other demand response not described above

Not applicable.

viii. Other energy efficiency not described above

The UC system has executed over 1,100 energy efficiency projects across the campuses and medical centers, reducing the UC system's energy use by 12% since 2009 on a per square foot basis. These projects are designed to both reduce the reliance on fossil fuel energy and result in cost savings. Though this is more general to the UC system as a whole and not specifically conducted through the UC's ESP, the cost savings impact UC's DA accounts.

ix. Other distributed generation not described above

The UC system has seven operational behind the meter Combined Heat and Power ("CHP") facilities, four of which are located behind Direct Access meters served by UC's Clean Power Program. When they were installed between 1980 and 2012, the plants were the lowest-emission, most cost-effective options available. The CHP plants currently provide cost-effective and reliable power, hot water and steam, and are an important resilience tool to protect patient lives and billions of dollars of research in the face of increasingly frequent power outages caused by wildfires and grid stress. However, UC recognizes the need to transition away carbon-emitting fuel sources and is convening a task force to guide the development of comprehensive decarbonization studies for all campus locations. Though this is more general to the UC system as a whole and not specifically conducted through the UC's ESP, decarbonization plans across the system could have a significant impact on future load served by UC's Clean Power Program. UC recognizes that BTM CHP emissions are currently modelled at the system level and allocated on a pro-rata basis to individual LSEs, but this could change in future iterations of the IRP.

x. Transportation electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

UC's Policy on Sustainable practices encompasses sustainable transportation, including the operation of fleet vehicles in alignment with UC's 2025 carbon neutrality goals. UC has adopted a policy requiring 50% of all vehicle acquisitions after July 1, 2023 to be zero-emission, plug-in hybrid or dedicated clean transportation fueled vehicles. Though this is more general to the UC system as a whole and not specifically conducted through the UC's ESP, transportation electrification at UC campuses will impact UC's clean power program to the extent that they increase electric load behind participating Direct Access meters.

xi. Building electrification, including any investments above and beyond what is included in Integrated Energy Policy Report (IEPR)

As discussed above, each UC campus is evaluating electrification of vast portions of their infrastructure as part of broader decarbonization studies, and several campuses have already launched ambitious direct electrification efforts. UC's Policy on Sustainable practices addresses green building design, including a requirement for all new buildings to achieve a minimum of

LEED Silver certification. Many buildings aim to exceed this target, including the currently under construction Interactive Learning Pavilion at UC Santa Barbara, which will be a state-of the art all-electric facility. Though these policies and projects are primarily the purview of UC campuses, building electrification across the system will impact UC's Clean Power Program load over time, to the extent that it increases the electricity demand of facilities served by participating Direct Access meters.

xii. Other

UC continuously explores new methods of lowering electricity demand and increasing clean energy supply. For example, UC is exploring a potential microgrid project to deploy solar and storage system to UC critical facilities. Other potential projects include affordable housing microgrid installations.

b. Disadvantaged Communities

UC's situation is unique, in that the Load Serving Entity and the "customers" are all part of the broader University of California system and subject to the same internal goals and policies. Rather than adopting the construct of a default supply mix and distinct supply options with a higher percentage of renewable or local resources, UC manages a single portfolio on behalf of all participating DA campuses and facilities that aligns with both UC policies and the state's emission reduction goals. There are currently over 100 onsite solar PV systems, totaling nearly 50 MW, located across the UC system; many of which are located behind DA meters. UC continues to support development of onsite renewable generation across the system, as well as broader efforts aimed at decarbonization of facilities and transportation.

UC ongoing efforts to support DACs include the following:

- UC will continue its practice of not procuring fossil generation resources, including fossil resources located in or near DACs.
- UC will continue to procure renewable and carbon free generation to reduce its reliance on unspecified system power, minimizing the potential for indirect impacts on DACs.
- For future procurement, UC will consider each resource's potential positive economic and environmental impacts on DACs.
- UC will continue its efforts to develop procurement strategies that align with environmental and social justice benefits.
- UC will continue its efforts to support the UC system's educational and research goals by providing the system with energy cost savings and environmental benefits.

UC will continue to put DACs in the center of procurement decisions when considering specific resource types, locations, and timelines for different resources. In all future RFP processes, environmental impacts (i.e., pollutants) and benefits to the local community (i.e., jobs, economic development) within DACs will be listed as key evaluation criteria when scoring different potential future resources. Along the same lines, UC will aim to make all of its procurement

processes (including RFPs) more inclusive, so that more potential developers have the opportunity to submit bids.

c. Commission Direction of Actions

UC encourages the Commission to adopt durable rules and processes to bring greater stability to the regulatory framework within which UC and other suppliers must plan and operate. Frequent rule changes disrupt UC's ability to execute long-term planning activities and adopted planning elements while minimizing program costs. Such regulatory changes can also result in a significant administrative burden, which disproportionately impacts small LSEs. Certain regulatory changes may necessitate duplicative procurement efforts and/or stranded investments that are expected to impact a larger portion of UC's portfolio.

For example, the Commission is currently considering a programmatic approach to the IRP, a Slice-of-Day Resource Adequacy Program, and recently implemented the Central Procurement Entity structure. Each of these changes on their own represent significant regulatory uncertainty, which leads to market uncertainty. These changes together represent a complex, wholesale change to the regulatory landscape, which LSEs cannot reasonably account for in planning.

V. Lessons Learned

UC recognizes the improvements made to the data templates relative to the 2020 planning cycle, including consolidation of the new and baseline templates and enhancements to better capture the full range of resources in LSE existing and planned portfolios. UC believes that additional improvements in the data templates can be made, and UC looks forward to further discussions with Energy Division staff in this regard. UC's experience completing the Resource Data Template and the Clean System Power tools leads to the following observations and suggestions:

- Consolidation of the energy and capacity values into the unique contacts tab of the RDT (i.e., eliminating the monthly_gwh_mw tab) significantly streamlined the process of completing the required spreadsheets
- Iterative corrections to the RDT templates, while difficult to avoid, do cause significant re-work and sometimes introduce new errors that need to be identified and manually corrected
- Certain data fields, such as CAM allocations, would be better disaggregated and assigned on an LSE-specific basis. Requiring each LSE to interpret the instructions for calculating their own allocations, which ultimately needs to be rolled up to the system level to the Commissions analysis, is time consuming and likely to introduce errors.

Considerable time and effort are required to complete the necessary templates, which remains a concern for small LSEs like UC. UC requests that Energy Division staff consider whether all requested data is critical to the IRP process, and if not, UC respectfully requests that non-critical data requirements be eliminated from future processes. UC recognizes that the IRP process is evolving, but there is always room for improvement in providing clear and consistent instructions in a timely manner.

Glossary of Terms

Alternative Portfolio: *LSEs are permitted to submit "Alternative Portfolios" developed from scenarios using different assumptions from those used in the Preferred System Plan with updates. Any deviations from the "Conforming Portfolio" must be explained and justified.*

Approve (Plan)*: the CPUC's obligation to approve an LSE's integrated resource plan derives from Public Utilities Code Section 454.52(b)(2) and the procurement planning process described in Public Utilities Code Section 454.5, in addition to the CPUC obligation to ensure safe and reliable service at just and reasonable rates under Public Utilities Code Section 451.*

Balancing Authority Area (CAISO): *the collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.*

Baseline resources: *Those resources assumed to be fixed as a capacity expansion model input, as opposed to Candidate resources, which are selected by the model and are incremental to the Baseline. Baseline resources are existing (already online) or owned or contracted to come online within the planning horizon. Existing resources with announced retirements are excluded from the Baseline for the applicable years. Being "contracted" refers to a resource holding signed contract/s with an LSE/s for much of its energy and capacity, as applicable, for a significant portion of its useful life. The contracts refer to those approved by the CPUC and/or the LSE's governing board, as applicable. These criteria indicate the resource is relatively certain to come online. Baseline resources that are not online at the time of modeling may have a failure rate applied to their nameplate capacity to allow for the risk of them failing to come online.*

Candidate resource: *those resources, such as renewables, energy storage, natural gas generation, and demand response, available for selection in IRP capacity expansion modeling, incremental to the Baseline resources.*

Capacity Expansion Model: *a capacity expansion model is a computer model that simulates generation and transmission investment to meet forecast electric load over many years, usually with the objective of minimizing the total cost of owning and operating the electrical system. Capacity expansion models can also be configured to only allow solutions that meet specific requirements, such as providing a minimum amount of capacity to ensure the reliability of the system or maintaining greenhouse gas emissions below an established level.*

Certify (a Community Choice Aggregator Plan)*: Public Utilities Code 454.52(b)(3) requires the CPUC to certify the integrated resource plans of CCAs. "Certify" requires a formal act of the Commission to determine that the CCA's Plan complies with the requirements of the statute and the process established via Public Utilities Code 454.51(a). In addition, the Commission must review the CCA Plans to determine any potential impacts on public utility bundled customers under Public Utilities Code Sections 451 and 454, among others.*

Clean System Power (CSP) methodology*: the methodology used to estimate GHG and criteria pollutant emissions associated with an LSE's Portfolio based on how the LSE will expect to rely on system power on an hourly basis.*

Community Choice Aggregator*: a governmental entity formed by a city or county to procure electricity for its residents, businesses, and municipal facilities.*

Conforming Portfolio*: the LSE portfolio that conforms to IRP Planning Standards, the 2030 LSE-specific GHG Emissions Benchmark, use of the LSE's assigned load forecast, use of inputs and assumptions matching those used in developing the Reference System Portfolio, as well as other IRP requirements including the filing of a complete Narrative Template, a Resource Data Template and Clean System Power Calculator*.

Effective Load Carrying Capacity*: a percentage that expresses how well a resource is able avoid loss-of-load events (considering availability and use limitations). The percentage is relative to a reference resource, for example a resource that is always available with no use limitations. It is calculated via probabilistic reliability modeling, and yields a single percentage value for a given resource or grouping of resources.*

Effective Megawatts (MW): *perfect capacity equivalent MW, such as the MW calculated by applying an ELCC % multiplier to nameplate MW.*

Electric Service Provider*: an entity that offers electric service to a retail or end-use customer, but which does not fall within the definition of an electrical corporation under Public Utilities Code Section 218.*

Filing Entity*: an entity required by statute to file an integrated resource plan with CPUC.*

Future*: a set of assumptions about future conditions, such as load or gas prices.*

GHG Benchmark (or LSE-specific 2030 GHG Benchmark)*: the mass-based GHG emission planning targets calculated by staff for each LSE based on the methodology established by the California Air Resources Board and required for use in LSE Portfolio development in IRP.*

GHG Planning Price: *the systemwide marginal GHG abatement cost associated with achieving a specific electric sector 2030 GHG planning target.*

Integrated Resources Planning Standards (Planning Standards)*: the set of CPUC IRP rules, guidelines, formulas and metrics that LSEs must include in their LSE Plans.*

Integrated Resource Planning (IRP) process*: integrated resource planning process; the repeating cycle through which integrated resource plans are prepared, submitted, and reviewed by the CPUC*

Long term*: more than 5 years unless otherwise specified.*

Load Serving Entity*: an electrical corporation, electric service provider, community choice aggregator, or electric cooperative.*

Load Serving Entity (LSE) Plan*: an LSE's integrated resource plan; the full set of documents and information submitted by an LSE to the CPUC as part of the IRP process.*

Load Serving Entity (LSE) Portfolio*: a set of supply- and/or demand-side resources with certain attributes that together serve the LSE's assigned load over the IRP planning horizon.*

Loss of Load Expectation (LOLE): *a metric that quantifies the expected frequency of loss-of-load events per year. Loss-of-load is any instance where available generating capacity is insufficient to serve electric demand. If one or more instances of loss-of-load occurring within the same day regardless of duration*

are counted as one loss-of-load event, then the LOLE metric can be compared to a reference point such as the industry probabilistic reliability standard of "one expected day in 10 years," i.e. an LOLE of 0.1.

Maximum Import Capability: a California ISO metric that represents a quantity in MWs of imports determined by the CAISO to be simultaneously deliverable to the aggregate of load in the ISO's Balancing Authority (BAA) Area and thus eligible for use in the Resource Adequacy process. The California ISO assess a MIC MW value for each intertie into the ISO's BAA and allocated yearly to the LSEs. A LSE's RA import showings are limited to its share of the MIC at each intertie.

Net Qualifying Capacity (NQC): *Qualifying Capacity reduced, as applicable, based on: (1) testing and verification; (2) application of performance criteria; and (3) deliverability restrictions. The Net Qualifying Capacity determination shall be made by the California ISO pursuant to the provisions of this California ISO Tariff and the applicable Business Practice Manual.*

Non-modeled costs*: embedded fixed costs in today's energy system (e.g., existing distribution revenue requirement, existing transmission revenue requirement, and energy efficiency program cost).*

Nonstandard LSE Plan*: type of integrated resource plan that an LSE may be eligible to file if it serves load outside the CAISO balancing authority area.*

Optimization*: an exercise undertaken in the CPUC's Integrated Resource Planning (IRP) process using a capacity expansion model to identify a least-cost portfolio of electricity resources for meeting specific policy constraints, such as GHG reduction or RPS targets, while maintaining reliability given a set of assumptions about the future. Optimization in IRP considers resources assumed to be online over the planning horizon (baseline resources), some of which the model may choose not to retain, and additional resources (candidate resources) that the model is able to select to meet future grid needs.*

Planned resource: *any resource included in an LSE portfolio, whether already online or not, that is yet to be procured. Relating this to capacity expansion modeling terms, planned resources can be baseline resources (needing contract renewal, or currently owned/contracted by another LSE), candidate resources, or possibly resources that were not considered by the modeling, e.g., due to the passage of time between the modeling taking place and LSEs developing their plans. Planned resources can be specific (e.g., with a CAISO ID) or generic, with only the type, size and some geographic information identified.*

Qualifying capacity*: the maximum amount of Resource Adequacy Benefits a generating facility could provide before an assessment of its net qualifying capacity.*

Preferred Conforming Portfolio*: the conforming portfolio preferred by an LSE as the most suitable to its own needs; submitted to CPUC for review as one element of the LSE's overall IRP plan.*

Preferred System Plan: *the Commission's integrated resource plan composed of both the aggregation of LSE portfolios (i.e., Preferred System Portfolio) and the set of actions necessary to implement that portfolio (i.e., Preferred System Action Plan).*

Preferred System Portfolio: *the combined portfolios of individual LSEs within the CAISO, aggregated, reviewed and possibly modified by Commission staff as a proposal to the Commission, and adopted by the Commission as most responsive to statutory requirements per Pub. Util. Code 454.51; part of the Preferred System Plan.*

Short term*: 1 to 3 years (unless otherwise specified).*

***Staff**: CPUC Energy Division staff (unless otherwise specified).*

***Standard LSE Plan**: type of integrated resource plan that an LSE is required to file if it serves load within the CAISO balancing authority area (unless the LSE demonstrates exemption from the IRP process).*

***Transmission Planning Process (TPP)**: annual process conducted by the California Independent System Operator (CAISO) to identify potential transmission system limitations and areas that need reinforcements over a 10-year horizon.*