Rulemaking No.: 20-11-003 .

Exhibit No.:

Date: September 1, 2021

Witness Gordon Samuel

Commissioner Marybel Batjer

ALJ Brian Stevens

OPENING PREPARED TESTIMONY OF GORDON SAMUEL
ON BEHALF OF
VALLEY CLEAN ENERGY

Rulemaking 20-11-003
2021 Extreme Weather Event Reliable Electric Service

September 1, 2021

R.20-11-003 (Extreme Weather)
OPENING PREPARED TESTIMONY OF
VALLEY CLEAN ENERGY

TABLE OF CONTENTS

R.20-11-003 (Extreme Weather)
OPENING PREPARED TESTIMONY OF
VALLEY CLEAN ENERGY

I.
EXECUTIVE SUMMARY

INTRODUCTION TO VCE COMMENTS

Rulemaking (R.) 20-11-003 is the Order Instituting Rulemaking (OIR) to Establish Policies, Processes, and Rules to Ensure Reliable Electric Service in California in the Event of an Extreme Weather Event in 2021. On December 18, 2020, Administrative Law Judge (ALJ) Stevens issued a Ruling Introducing a Staff Report and Questions to the Record and Seeking Responses from Parties in Opening and Reply Testimonies (December 18 ALJ Ruling). Attached to the December 18 ALJ Ruling is the Final Staff Proposals and Guidance to Parties (Staff Proposals and Guidance). On December 21, 2020, Assigned Commissioner Batjer issued an Assigned Commissioner's Scoping Memo and Ruling (Scoping Memo).

In its Energy Division Staff Concept Paper Proposals for Summer 2022 and 2023 Reliability Enhancements the Commission encouraged VCE to revisit its irrigation load reduction proposal with additional details and to "design the experimental rate incorporating the ideas in the 6-step Distributed Energy Resource (DER) & Demand Flexibility roadmap described by ED Staff at the May 25, 2021, workshop on Advance DER and Demand Flexibility Management, specifically Steps 2 through 6."

By this Testimony, Exhibit (Ex.) VCE-01, VCE provides its proposal regarding an Agricultural AutoDR Demand Flexibility Pilot.

II.
VCE'S AGRICULTURAL AUTODR DEMAND FLEXIBILITY PILOT PROPOSAL

Q: PLEASE EXPLAIN WHY VCE FOCUSES ON AGRICULTURAL IRRIGATION TO HELP WITH SUMMER RELIABILITY?

A: Agricultural pumping has more shed and shift potential that can be built more quickly at lower costs than other sectors[1]. Charts 1 and 2 below from the LNBL DR Potential Study

[1] *See*, LNBL DR Potential Study Phase 3.

Phase 3 show this potential. Valley Clean Energy has a strong focus on the agricultural sector with more than 85% of its service territory designated for agricultural use[2]. Due to this high concentration, the agricultural sector represents approximately 18% of VCE's total annual load and 16% of its peak demand. For the agricultural sector served by VCE this equates to an annual usage of 140,000 MWh out of a system total of 750,000 MWh/year and a peak demand of 35 MW out of a total peak demand of 215 MW.

Chart 1:

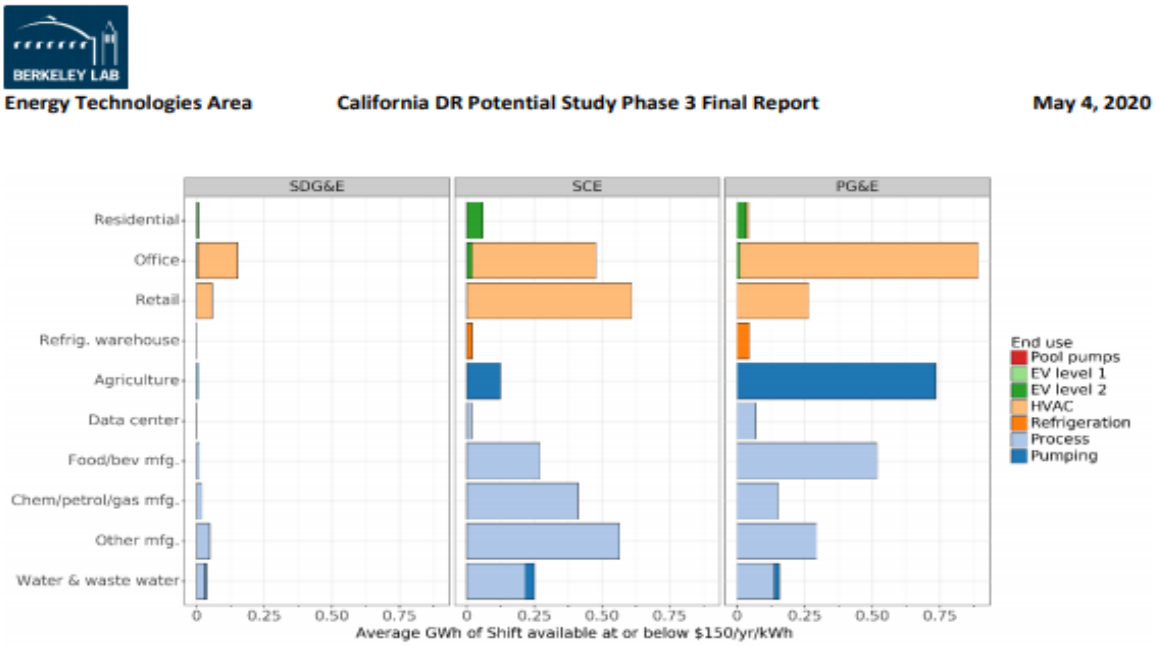


Figure 3-9. The Shift resource available in forecast year 2030 at the BTM battery price referent ($150/yr/kWh), disaggregated by utility service territory, building type, and end use.

[2] County of Yolo, 2005. Background Report for the Yolo County General Plan Update. Woodland, CA.

Chart 2:

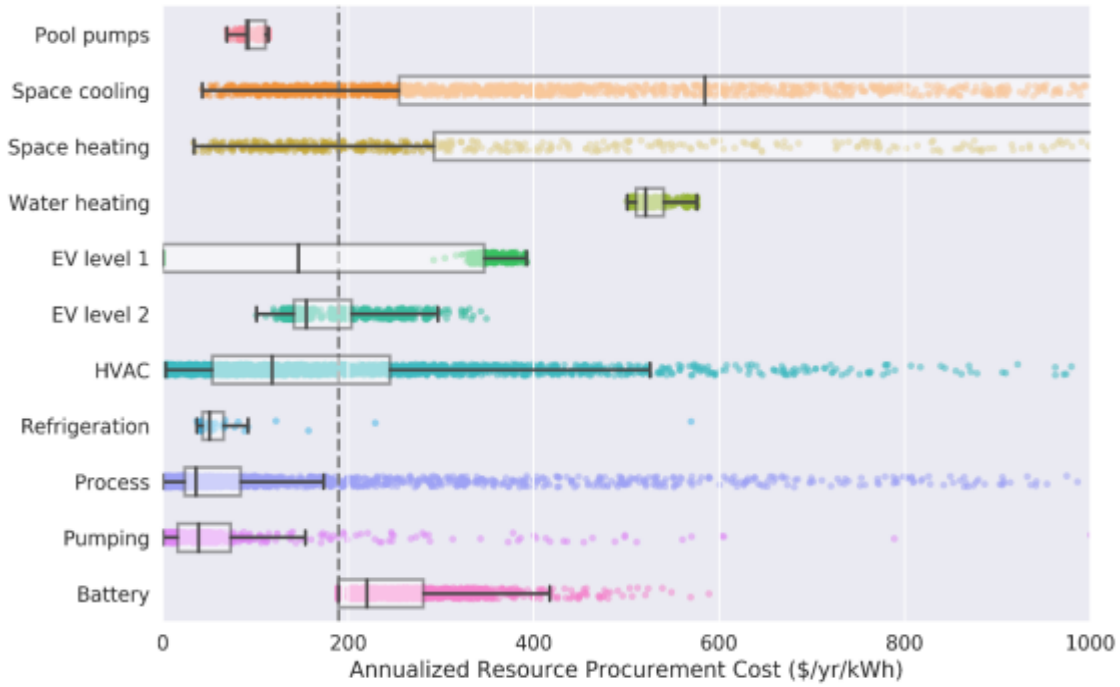


Figure 3-17. Installed costs, circa 2015, for Shift-enabling technologies, by end use, for a typical site in each customer cluster modeled in DR-Path. The minimum battery cost is shown as a vertical dashed line for reference. Box plots show the interquartile range (IQR, middle 50 percent of cluster costs), and whiskers show points beyond the IQR that are within 1.5 times the magnitude of the IQR.

VCE is committed to providing its customer members with reliable, clean power while contributing to overall system reliability and the state's decarbonization goals. With the ratemaking authority afforded to it, VCE can take advantage of latent demand flexibility of its irrigation load to advance these goals and meet the moment of this proceeding by reducing net peak demand in the near future and beyond.

Q: HOW DOES VCE PROPOSE TO TAKE ADVANTAGE OF THIS POTENTIAL RESOURCE?

A: VCE proposes to implement an Agricultural AutoDR Demand Flexibility pilot to be made available to customers on irrigation pumping tariffs. The pilot will include automation of these loads to receive dynamic price signals and implementation of an experimental rate that incorporates dynamic energy and capacity charges in hourly prices. Customers who successfully respond to the price signals and shift load out of expensive

hours—typically the ramp hours—will enjoy bill savings and the total cost to serve VCE customers will be reduced.

PILOT CONCEPT

Q: WHAT ARE THE CHALLENGES THE PILOT WILL ADDRESS?

A: The concept for the pilot builds on the UNIDE framework as elaborated in the *Forward Looking Vision: Advanced DERs & Demand Flexibility* presentation by the DR Section of the Energy Division on May 25, 2021. That framework incorporates approaches developed by TeMix and tested in the agricultural sector by Polaris Energy Services, both of which contributed to this proposal.

The challenges identified in achieving DR and Demand Flexibility are magnified in the irrigation pumping sector, especially with regard to CAISO market integration, measurement & verification" and "administratively & technically complex, inefficient, high transaction costs" as documented extensively in the draft report for EPC-16-045.

These challenges are compounded under the CCA/IOU construct. VCE has a significant financial interest for its members in shifting load from ramp hours as well as a mission to transition to a reliable, decarbonized grid. But VCE is limited in its ability to innovate when customers pay demand charges and participate in DR programs under the IOU umbrella. This construct hamstrings the State by not taking advantage of the CCA's ability to set rates to send timely, targeted price signals and its "trusted source" relationship with its customers.

Q: HOW DOES VCE PROPOSE TO ADDRESS THESE CHALLENGES?

A: The UNIDE approach provides a roadmap to address these issues. Fundamentally, providing a simple price signal overcomes many of these issues. The approach is supported by the results of EPC-16-045, which documents how providing irrigation pumping customers with a single, simple price signal, rather than complex TOU rates coupled with an array of DR options, elicits significantly more load shift and provides

significantly greater value to customers.[3] One elegant solution 'kills many birds with one stone.' A simple price signal:

- Aligns frequent load shift and operational (behavior) modification that is needed for decarbonization with occasional load shed that is needed to maintain reliability.
- Eliminates the rigid program enrollment and management process that absorbs a large slice of the demand flexibility pie and serves as a disincentive to participation.
- Eliminates the vagaries, complexities and inefficiencies of trying to hammer the square demand-side peg into the round supply-side hole, including ill-fitting counterfactual baselines, commitment timelines (enrollment and nomination) that do not align with customer planning horizons, and CAISO/IOU settlement processes.

Irrigation pumping is a particularly good sector on which to focus because:

- There is inherent, untapped flexibility in operations for up to 100% of peak load behind a meter, compared to a portion of load for most other sectors, such as approximately 25% reduction available in commercial buildings.
- The reasons that the load has not responded at high rates to TOU signals and DR programs can largely be addressed by this approach because it overcomes the complexity of TOU signals and current DR programs.

The agricultural sector is under significant financial pressure and in the midst of technology adoption that allows irrigation to respond more easily to simple energy price signals.

[3] EPC-16-045 Final Report: "Technologies and Strategies for Agricultural Load Management to Meet Decarbonization Goals".

PILOT SCOPE AND POTENTIAL AT SCALE

Q: PLEASE DESCRIBE THE NUMBER OF MEGAWATTS THAT WILL BE ELIGIBLE FOR THE PILOT.

A: VCE proposes to target initial enrollment in the pilot of approximately 5 MW of connected irrigation load, representing approximately 100 utility service points. At scale, there is approximately 35 MW of agriculture sector load served by VCE.

Based on data presented on the Transactive Energy Pilot conducted under EPIC project EPC-16-045, agricultural customers were able to shift 67% of ramp hour load (4 – 9 p.m.) in the first year of participation, and irrigation shift potential is estimated to be 74% of ramp hour load across California. Shift potential is based on analysis of weekly load profiles for 1,100 service points to identify how many hours of pump run time could be shifted from the ramp without changing the total weekly run time (which is how irrigations schedules are typically denominated). Using this methodology, there is approximately 6,000 MWh of annual shift potential across irrigation pumps served by VCE. The pilot would initially target 10% of that load.

VCE Ag Load Shift Potential	
1	kW
8,760	Hrs/Yr
22%	Load Factor
1,927	Running Hrs/Yr
13%	5 hrs in Shift Window (16-21)
74%	Operational Shift Potential
178	Shift Hrs/Yr
35	VCE Agricultral Peak MW
6,239	MWh Shift/Yr

TARIFF DESIGN

Introduction to the UNIDE Tariff

Q: HOW WILL THE TARIFF PROVIDE A SUFFICIENT INCENTIVE TO SHIFT LOAD?

A: The UNIDE suggested tariff is a two-part tariff: a *subscription part*[4] and a *dynamic part*. This tariff is also known as a Subscription Transactive Tariff (STT). For this VCE Ag Pilot we plan to use only the dynamic component to simplify recruitment of participants and demonstrate proof of concept. Based on outcomes of the pilot, VCE will consider the benefits of implementing the subscription component to help drive customer participation and value.

Dynamic Tariff

The dynamic part is hourly or sub-hourly prices for electric energy. VCE proposes to use only hourly prices in the pilot. The dynamic hourly price is a bundled energy price to buy electric energy at the customer's location.

The existing applicable VCE tariff for an agricultural customer is complex, as it involves a:

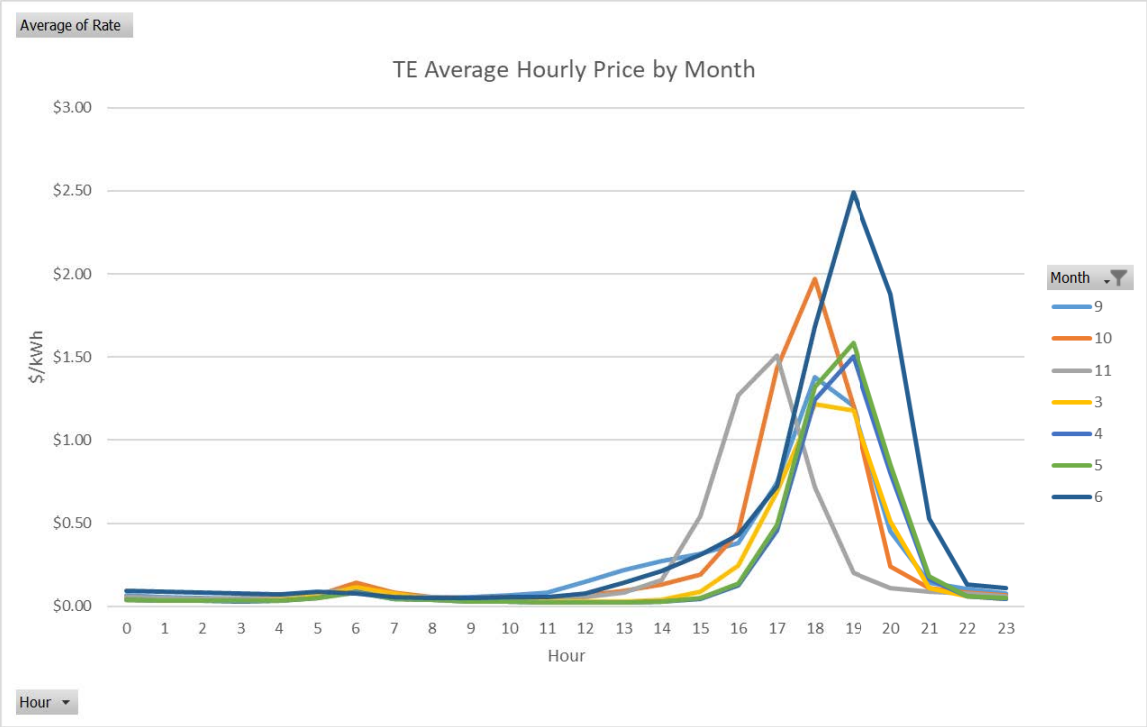
1. Customer Charge
2. Meter Charge;
3. Summer / Winter Demand Charge ($/kw per month);
4. Time-of-Use Total Energy Charge ($/kWh);
5. Additional options such as peak day pricing, net energy metering, and demand response programs.

The goal is to simplify the tariff to an energy price only so that customers can more easily manage or automatically manage their electricity use (and self-generation) to save money

[4] **Subscription Part**
The subscription part is a fixed monthly bill for a specific hourly kWh load shape for the month. The fixed monthly bill and the hourly load shape will vary by month, based on the customer's projected needs. If the customer uses more or less than the subscribed kWhs in any hour then the customer's bill is charged or credited for the difference in kWh times a dynamic hourly $/kWh price determined by the dynamic part of the tariff.

while also reducing the costs to VCE and its overall customer base. The dynamic rate will in essence provide an economic incentive to irrigate during non-peak hours, even if the peak hours shift themselves. Further, the price will shift depending on the magnitude of the scarcity of electricity during the peak.

For example, in the chart below, the most expensive hour (on average) varied between 5 and 7 p.m. and the average price for that hour varied between $1.25 and $2.50/kWh. Customers responding to these signals provide the load shift needed by the grid at any given time much more effectively than by lackluster response to a TOU rate of fixed amount and timing across an entire season and determined years in advance.



Dynamic Price Design Process

Q: HOW WILL YOU DESIGN THE TARIFF?

A: VCE will approve the final design of the tariff for this project, and the process of tariff design will involve discussions with VCE's management team, scheduling coordinator (SMUD), distribution operator (PG&E), and PG&E's regulator (CPUC).

TeMix will use a tariff design worksheet to develop and calibrate the simple curves or formulas that will set the hourly dynamic energy price for each hour as a function of:

1. The CASIO hourly Locational Marginal Price
2. The load on the local distribution grid or circuit
3. The hourly total and net load placed by VCE and/or PG&E on the wholesale grid;
4. All fixed and variable costs of energy including resource adequacy (RA);
5. All fixed and variable costs of distribution
6. Other costs

The tariff formulas will be calibrated to fully recover projected VCE total costs including distribution costs paid to PG&E. The variability of the tariff prices as a function of VCE load will be adjusted to provide a strong signal for customers to shift load from high price hours to lower price hours while reducing the energy, distribution, and RA costs to VCE.

Price Publication

Q: HOW WILL CUSTOMERS BE MADE AWARE OF PRICES?

A: The hourly prices will be updated based on the grid supply and demand as affected by weather and other factors.

The hourly prices will be published when the CAISO publishes its Day-ahead prices for the 24 hours of the next day. The customer bill for each hour will be the Day-ahead hourly price times and the actual hourly kWh meter reading.

Projections of hourly prices may be provided a week-ahead. The prices may be nonbinding or binding, at the option of VCE. In the case of binding week-ahead prices, the customers could be offered the opportunity to lock in prices for scheduled kWh of energy in each hour.

Customers will be made aware of prices using web and mobile apps that will be provided to participants in a format similar to the screenshot below, that enables them to see the energy cost of a schedule they select or enter operational constraints to receive a recommended schedule. The app can be used as a standalone decision support tool, send schedules directly to a pump automation controller, or integrate with common irrigation management systems.

PILOT EXECUTION

Q: HOW WILL VCE IMPLEMENT THE PILOT?

A: VCE expects to work with the EPIC grantees that have developed and tested this approach and technology—TeMix and Polaris Energy Services—to develop the dynamic tariff and implement the system that will communicate prices to customers. It may

engage a third-party program implementer to administer incentives, market the program and manage other aspects of the program.

- Recruitment – will use a multi-pronged approach including:
  - Direct outreach by VCE.
  - Marketing by a program implementer.
  - Engagement with technology companies that develop AutoDR projects or that offer control systems that can help customers respond to dynamic price signals.
  - VCE's service territory includes UC Davis and Yolo County, both hubs for agricultural and energy innovation. If selected to proceed, VCE would engage its pre-existing relationships with key members of the local agricultural sector and the UC Davis Energy and Efficiency Institute to advance participation in the pilot-program and the understanding of its outcomes. In addition, as noted in VCE's original testimony, Sonoma Clean Power has offered its support for development, execution, and diffusion of the Pilot program and its results which adds further expertise to the team and value to the program.
- Technology Deployment
  - Price signals generated according to the experimental tariff will be published and displayed using the TeMix – Polaris cloud-to-cloud app described above that was tested under EPC-16-045.
  - Participants can access and respond to those signals using the Polaris control system, a different unspecified third party system that retrieves the signals via an API, or without a technology integration by viewing prices in the platform and implementing schedules manually or with unconnected automation systems.
- Program Execution - once underway, VCE and the program partners will:
  - Monitor the prices published by the tariff and continually assess customer costs on the tariff compared to the OAT.
  - Measure irrigation response to the tariff versus historical load profiles.

- Support customers in use of the system and present their individual costs and estimated savings when responding to the signals.
- Program Monitoring/Reporting/Verification
  - Monitor results, including bills compared to the otherwise applicable tariff (OAT) and the share of load shifted compared to prior years.
  - Report results bi-annual; final results at pilot conclusion.
  - Recommendations based on results, including applicability to other geographical regions, applicability to other sectors and adoption and/or changes to implementation of the UNIDE framework.

PILOT FUNDING AND REGULATORY CONSIDERATIONS

Q: HOW DOES VCE PROPOSE TO RECOVER ITS COSTS FOR THE PILOT?

A: VCE proposes to file an Advice Letter with the Commission to recover its costs for the Pilot. VCE proposes that the Commission approve the following mechanisms to recover those costs using a pilot energy rate. The VCE pilot costs can be divided into four buckets:

- Generation ('energy') – VCE will implement a pilot cost recovery rate and receive the generation component of the customer bills. VCE will bear the difference between its cost of generation and costs recovered through customer bills if there is a shortfall.
- Delivery ('demand') – the hourly delivery charges collected according to the pilot tariff will be paid to the Investor Owned Utility (IOU) in lieu of demand charges on the otherwise applicable tariff. The IOU will be held harmless for any difference between the pilot rate's distribution charge based revenue and the otherwise applicable tariff through rate recovery mechanisms approved by the Commission such as a memorandum account.
- Automation ('AutoDR') – funds from the AutoDR program budget, for which participating customers are eligible, will be available to those who agree to remain on the pilot rate for a period of three years, according to a method

enumerated in the Advice Letter. These funds will cover the costs for new technology.

- Public goods charges collected from VCE customers will be made available to fund development and execution of the pilot so that VCE and bundled customers are made whole financially.

III.
CONCLUSION

Q: DO YOU HAVE ANY CONCLUDING REMARKS?

A: Yes. We believe irrigation demand reduction/shifting has the potential to improve summer reliability if agricultural customers can be recruited to participate in practical, cost-effective approaches that are responsive to their issues. With local knowledge and relationships, VCE can move quickly to recruit participants for the pilot and begin to gather the information and data required to determine whether to market the program to the agricultural community at large.

VCE's proposal will demonstrate an irrigation load reduction/shift framework at large pilot scale, building on research in smaller and more constrained pilots. If successful, it paves the way for a paradigm that aligns CCA and customer incentives with the state's policy imperatives. We strongly encourage the CPUC to consider this proposal as part of its effort to improve summer reliability.

Q: DOES THIS CONCLUDE YOUR TESTIMONY?

A: Yes.

APPENDIX A

STATEMENT OF QUALIFICATIONS

Gordon Samuel

STATEMENT OF QUALIFICATIONS OF GORDON SAMUEL

Q1 *Please state your name and business address.*

A1 My name is Gordon Samuel, and my business address is Valley Clean Energy (VCE), 604 2nd Street, Davis, California 95616.

Q2 *Briefly describe your present employment.*

A2 I am the Assistant General Manager/Power Director of VCE. My detailed resume is attached.

Q3 *Please summarize your professional and educational background.*

A3 I am a graduate of Penn State University with a Bachelor of Science in Civil/Structural Engineering. I have also received a Master of Business Administration from the University of Phoenix. From 1992 to 2017, I held various management roles at Arizona Public Service in resource planning and acquisition, finance, and day-ahead & term trading. I have been in my current role, Assistant General Manager & Director of Power Services, with VCE since 2020. My detailed resume is attached.

Q4 *Have you previously testified on behalf of VCE, before the California Public Utilities Commission?*

A4 Yes, I filed opening testimony on behalf of VCE in this docket on January 11, 2021.

Q5 *What is the purpose of your testimony?*

A5 The purpose of my testimony is to sponsor Exhibit VCE-02, the Opening Phase 2 Prepared Testimony of VCE in R.20-11-003 (Extreme Weather).

Q6 *Was Exhibit VCE-02 prepared by you?*

A6 Yes.

Q7 *Are the statements made in your testimony true and correct to the best of your knowledge and belief?*

A7 Yes.

Q8 *To the extent that Exhibit VCE-02 contains expressions of opinion, do they represent your best professional judgment?*

A8 Yes.

Q9 *Do you adopt Exhibit VCE-02 as your sworn testimony in R.20-11-003 (Extreme Weather)?*

A9 Yes.

Q10 *Does this conclude your statement of qualifications?*

A10 Yes, it does.

GORDON A. SAMUEL, JR., MBA

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Mobile: 480-205-1976 | E-mail: gordon.samueljr@gmail.com

-Delivering value for stakeholders and community through innovation, service, and safety excellence.-

Senior Utility Executive and Strategic Business Partner with 25+ years' experience leading business transformation, energy procurement, portfolio optimization, asset management, regulatory compliance, safety, and service reliability to drive next-level success and evolutional growth. **Leadership distinction** includes roles as *Manager, Day-Ahead & Term Trading, achieving a $30M annual savings for customers; Manager, Finance and Business Operations, with $550M budget; and Vice Chair, Western Systems Power Pool*. Deep experience building equitable partnerships across CCAs, Market Partners, Independent Power Producers, and Electric Cooperatives; and liaising with regulatory agencies. Advocate for transparent leadership, community interest, and environmental stewardship, .

Business Transformation ◆ High-ROI Contract Negotiations ◆ Strategic Vision & Execution

EXECUTIVE ACUMEN

- Long-term Strategic Planning & IRPs
- Resource Adequacy
- Contract Negotiations
- Regulatory Experience
- Safety Management Programs
- Capital Project Management
- Public Utility Ratemaking
- Future Energy Solutions
- Operations Management
- Contract Terms & Performance
- Infrastructure Renewal
- Resource Acquisitions

BOARD LEADERSHIP

Vice Chair, Western Systems Power Pool (WSPP) (2016 - 2017)
Board Member, Arizona Sports & Entertainment Commission (2013 - 2015)

EXECUTIVE CAREER PORTFOLIO

VALLEY CLEAN ENERGY (2020 - PRESENT)
ASSISTANT GENERAL MANAGER & DIRECTOR OF POWER SERVICES

Yolo County's community choice aggregation program .

Leading efforts of a newly-formed CCA from renewable power purchase agreements and impacts to annual budgets to staffing a growing new CCA.

- Negotiating and executing long term renewable agreements through request for offers (RFO) as well as bi-lateral discussions based on extensive knowledge of the western market and developer community. Securing large scale resources to provide long-term price stability as well as local resources to benefit Yolo County.
- Successfully partnered with another CCA to acquire Battery Energy Storage Systems (BESS) and aggregated demand response (DR) to satisfy incremental resource adequacy (RA) obligations.
- Actively engaged with outside consultants on all matters impacting VCE and the broader CCA community.
- In addition to power services director responsibilities, assist the interim general manager in all aspects of the business.
- Routinely prepare and present to board of directors as well as community advisory committee.

Engagement in regulatory developments at the CPUC, CEC and CalCCA in order to adjust strategic direction based on the ever-changing regulatory landscape.

MARIN CLEAN ENERGY (2019)
SR. POWER RESOURCES MANAGER

California's first CCA program dedicated to reducing energy related greenhouse gases.

Conducting all phases of resource planning and procurement from integrated resource planning (IRP), to request for proposals, to contract negotiations and contract management of clean, renewable resources. Developing strategies utilizing emerging technologies to achieve 100% renewable portfolio.

DOOSAN GRIDTECH (2017 - 2018)
DIRECTOR, SALES & BUSINESS DEVELOPMENT

Early market leader in delivering innovative technology solutions within the energy storage software market.

Established and developed key account relationships in an electric load-serving portfolio comprised of Investor-Owned Utilities, Public Power, Independent Power Producers, Electric Cooperatives, and Community Choice Aggregators. Penetrated emerging markets through analysis of customer requirements and solution-based selling.

- **Prospected and secured the largest** Doosan GridTech contract to date, and upon finalization will nearly achieve annual revenue goal; attained second year $75M sales goal by introducing a BESS.

ARIZONA PUBLIC SERVICE (APS) (1992 - 2017)
SENIOR LEADERSHIP ROLES

Largest electric utility in Arizona, with 8,000 MW of generating capacity, and serving more than 1.1 million customers throughout 11 of 15 counties. APS is the principal subsidiary of publicly traded Pinnacle West Capital, an S&P 500.

MANAGER, DAY-AHEAD & TERM TRADING (2014 - 2017)

25-year partnership with APS, leading asset management, resource planning, trading, competitive advantage, contract management, safety, and operational efficiency to deliver upon corporate and board objectives, with up to 20 direct reports. Since 2014 served as Manager, Day-Ahead & Term Trading, providing strategic direction and leadership in energy trades, risk management, and optimization of resources to meet load requirements and wholesale objectives. Directed complex initiatives, and led demand forecasting and modeling to fully leverage market commodities in trading of power/natural gas.

- **Drove business continuity and rate savings** for customers through oversight of contract terms and performance.
- **Realized ratepayer savings of ~$30M per year** through best-in-class trading strategies and market modeling.
- **Chartered the Carbon Compliance Program** to meet entity registration and sales requirements with the California Independent System Operator (CISO) and California Air Resource Board (CARB).
- **Member of leadership team that implemented** the CISO Energy Imbalance Market (EIM) for APS, advancing a competitive position with entry into this market, and enabling increased customer savings.
- **Directed APS' Fuel Commodity Hedge Program,** with physical and financial trading positions of 3-year terms.
- **Innovated two unique day-ahead trading blocks,** aligning trading activity to address the duck curve; previously pioneered the initiative to change the way power is traded in the West, with evolution of Off Peak & On Peak trades.
- **Key resource** leading significant transactions requiring regulatory and corporate approval; liaised with external agencies, including the Arizona Corporate Commission (ACC).
- **Analyzed real-time and post-transactional data** to establish and execute market-leading strategies to effectuate pricing advantages for APS customers in areas of power, transmission, and gas.
- **Provided strategic vision, business strategy, and execution** through financial and engineering acuity, serving as Advisor and Subject Matter Expert on Executive Committees and Boards, and collaborating with business leaders.
- **Identified opportunities and led business transformation** with development and integration of a Corrective Action Plan (CAP) addressing safety, risk mitigation, process improvements, and operational efficiencies.

MANAGER, FINANCE & BUSINESS OPERATIONS (2013 - 2014)

Directed financial operations, with fiscal authority of $550M+ budget ($400M+ Capital; $150M+ O&M) for the largest internal organization, Transmission and Distribution (T&D) with 1500+ employees.

- **Defined and implemented a comprehensive cost control structure,** achieving a 15% budget reduction.
- **Evaluated existing operational performance and KPIs,** and led corrective changes in talent staffing; built new team to industry-leading standards through appropriate resource allocation and position-level alignment.
- **Restructured department** to consist of dedicated Capital, and Operations and Maintenance (O&M) support teams, enabling stronger collaboration and service quality for internal T&D customers.

MANAGER, RESOURCE INITIATIVES & PLANNING (2010 - 2013)

Led complex roadmap and directed team in the preparation and filing of APS' Integrated Resource Plan (IRP) with the ACC, covering renewable energy standards, energy efficiency targets, emission thresholds, and increased market participation. Developed plan prioritizing actionable goals while providing flexibility in an evolving industry.

- **Managed development and selection of company's 15-year** resource plan, and formally submitted to the ACC.
- **Led a multi-department acquisition of Four Corners' 739 MW** coal-fired plant:
  - Facilitated regulatory application, testimony, discovery, and hearing processes; and liaised with Senior Executives.
  - Deal achieved $500M in customer savings; continued tax benefits for the Navajo Nation; and reduced air pollution.
- **Directed a $600M Capital Project** to replace aging assets with new combustion turbines:
  - Improved environmental quality through lower air pollution and lower water usage; increased tax revenue for the City of Tempe, and brought value to customers through more reliable, cost-efficient power.
- **Appeared and presented before the Arizona Corporate Commission** for regulatory rate case proceedings.

MANAGER, RESOURCE ACQUISITIONS & BUSINESS DEVELOPMENT (2004 - 2010)

Defined and managed the business strategy, resource acquisition RFP process, and project execution for conventional and renewable generation resources. Optimally positioned company to meet escalating load growth and updated regulatory compliance mandates and standards through strategic additions to APS' energy supply portfolio. Controlled costs through strategic planning and regularly engaging generation developers and IPPs on future opportunities.

- **Led critical mission of replacing aging fleet** through a comprehensive RFP due diligence process, including financial feasibility analyses, engineering reviews, and environmental impact reviews.
- **Project managed 20+ projects (2,000+ MW)** of new resources (Purchase Power Agreements and Asset Purchase Agreements), including natural gas generation, market products, renewable and demand response agreements.
- **Developed the Combustion Turbine Business Case** that offered a transmission alternative solution for a transmission-constrained region, and presented study to the Yuma Board of Supervisors.
- **Represented APS in renewable and demand response** matters before the Arizona Corporate Commission.

ENGINEERING RESOURCE PLANNING (1998 - 2004) | GENERATION ENGINEER (1992 - 1998)

EDUCATION, LICENSURES, AND PROFESSIONAL DEVELOPMENT

Selected Participant and Graduate | Scottsdale Leadership Class XXVIII
Master of Business Administration (MBA) Degree | University of Phoenix
Bachelor of Science (BS) Degree, Civil/Structural Engineering | Penn State University
Certified Professional Engineer (PE) | Arizona State Board of Technical Registration, License #31141

VOLUNTEER LEADERSHIP

Lifetime Committee Member, Fiesta Bowl (2003 - present)
Member and Community Event Participant, Neighbors Helping Neighbors (2016-present)