Valley Clean Energy CAC Meeting – Thursday, April 22, 2021 via video/teleconference

Item 10 – SMUD 2030 Zero Carbon Plan Presentation

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2030 Zero Carbon Plan

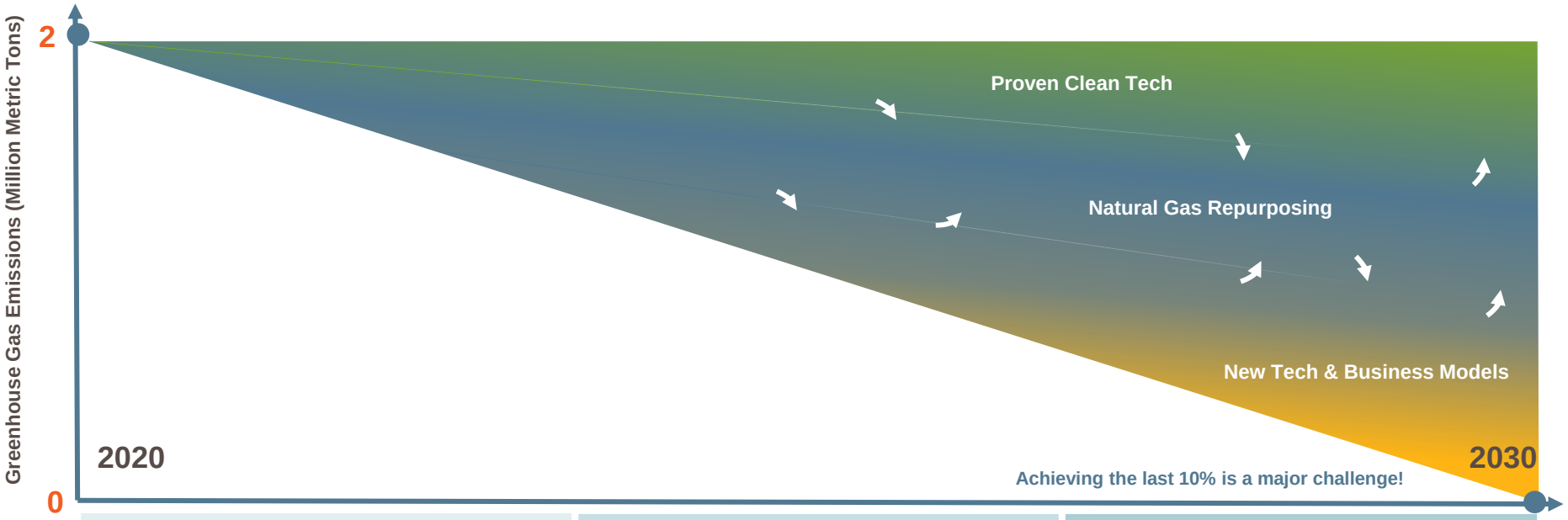
Presentation to Valley Clean Energy Community Advisory Committee
April 22,2021
Olof Bystrom
Project Manager, 2030 Zero Carbon Plan

Climate Emergency, New Goals and Plans

- SMUD's Board declared a Climate Emergency in July 2020 and directed General Manager and staff to identify actionable solutions to achieve carbon neutrality by March 31, 2021
- On April 15, 2021, SMUD formally adopted a new greenhouse gas emissions goal for energy supply of Zero by 2030
- This means that the electricity supply must be 100% carbon free 100% of the time by 2030
- The 2030 Zero Carbon Plan is a flexible roadmap for how to achieve this goal

SMUD

A flexible pathway with a firm commitment



2021-2023: Least flexibility, least risk

- Resource mix known.
- New Tech needs to be proven & piloted.
- Risks well known and hedged (costs/rates, regulatory, markets etc.).

2024-2026: More flexible, more uncertainty

- Resource tradeoffs - distributed resources, renewables, conventional plants.
- New Tech tested and beginning to scale.
- Risks are less known (resource prices, regulatory, markets, etc.).

2027-2030: Most flexible, least certain

- Resource tradeoffs - distributed resources, renewables, conventional plants, new tech.
- New Tech is proven and operational
- Risks are less clear (resource prices, regulatory, markets, etc.).

Flexible pathway to zero carbon

Natural gas generation repurposing

Goal to retire 2 power plants in 2024-2025 and re-tool fleet

to drastically reduce operations and emissions.

Proven clean tech

90% reduction of greenhouse gas emissions*

>3,000 MW of new renewable energy & storage –equivalent to energy needs of more than 600,000 homes.

Growing rooftop solar and batteries.

New tech & business models

Pilot & scale new projects & programs

Research game changing technologies and alternative fuels.

Financial impact & options

Rate impacts limited to rate of inflation

Expand partnerships and grants to offset costs & generate operational efficiencies.

Work with all our communities to reduce greenhouse gas emissions together.

Partner and collaborate with community organizations, attract business, innovation and jobs to Sacramento.

Alignment with SMUD's Sustainable Communities Initiative.

100% Zero carbon by 2030

* ~ 1.8 million metric tons per year

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3 Natural gas gen repurposing

Research plan: New large-scale technologies

- **Thermal/battery hybrid.** Enables plants to be online without burning fuel. Relatively mature today.
- **Clean fuels.** Research renewable natural gas and other zero or low carbon alternative fuels. Partnerships and grants will be critical.
- **SMUD pumped storage.** Research, design and potentially develop new pumped storage hydro with existing SMUD hydroelectric assets.
- **Long duration storage.** Research and pursue partnerships and grants (electro-thermal energy storage, liquid air energy storage, etc.).
- **Pre-combustion carbon capture.** Investigate Allam-Fetvedt cycle for CCS and explore venture partners and grants.
- **Green hydrogen.** Feasible in some of our plants but expensive and supply chain is unknown. Plan to follow development and be ready to invest if costs come down – major grant support or technology breakthrough needed.
- **Post-combustion carbon capture & storage.** Feasible and relatively proven technology but requires major capital investments on top of our aging plants.

Net Power's "Allam Fetvedt" Cycle Power Plant in La Porte, Texas

Success with these new technologies will alter the need & timing for other resources.

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1 Proven clean tech

Expand existing technology to:

Increase the amount of our electricity supply served by carbon free resources.

Resource diversity is critical

Plan

Target 90% of SMUD's electricity needs from renewable sources (excluding large hydro).

Research

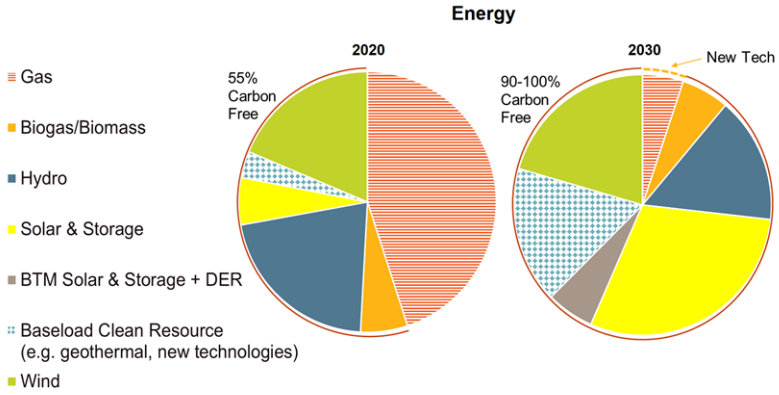
More reliability & system impact studies.

By 2030, build up to **3.5x** the amount of **renewables & battery** we have today.

~ 1,100 to 1,500 MW new local utility PV
~ 700 to 1,100 MW local batteries
~ 300 to 500 MW wind
~ 100 to 220 MW geothermal
~ 100 MW regional solar

Behind the meter resources

~ 500-750 MW solar
(add. ~30 to 55 MW per year)
~ 50-250 MW battery storage
(add. ~6 to 30 MW per year)



New utility-scale renewables equivalent to energy needs of >600,000 homes

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Proven Clean Tech Investment Overview

Resource	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Drew Solar (regional)		100 MW								
Solano Wind Phase 4				91 MW						
Local solar				250 MW		850-1,250 MW				
Local energy storage	4 MW			100 MW		600-1,000 MW				
Regional wind							300-500 MW			
Regional geothermal						100-220 MW				
Rooftop Solar	(30-55MW per year)									500-750 MW
Behind-the-meter batteries	(6-30 MW per year)									50-250 MW

Additional analysis & research needed to firm up resource plan:

- **Siting**: Local utility solar & storage siting and interconnection studies.
- **Delivery options**: Of non-local renewables (transmission, market rules/participation, accounting, costs)
- **Low hydro impacts**: Normal hydro generation assumed for the study; low hydro scenario to be assessed.
- **Beyond 2030 impacts**: We need to study impacts of this plan past 2030 (load growth by 2040).
- **Reliability**: Further in-depth reliability studies needed.

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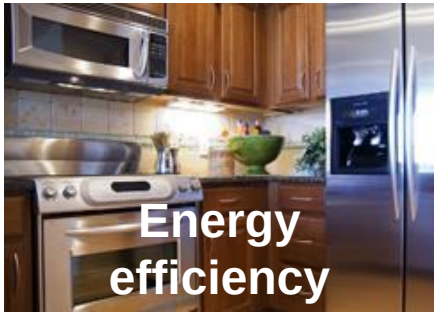
What is a Distributed Energy Resource (DER)?

A small modular generator, storage or behavioral resource that's installed behind the customer meter or directly connected to SMUD's system. Customer-owned examples include:



DERs and New Business Models

Electrification & decarbonization	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Building electrification	Implementation & pilots			Scale up & expand						
Transportation electrification	Implementation & pilots			Scale up & expand						
Cumulative equivalent all-electric homes (thousands)	54	57	60	65	71	81	93	119	131	154
Cumulative electric vehicle potential (thousands)	23	29	39	51	70	94	127	170	224	288

DER technology	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy education & behavioral DR	Implementation & pilots			Consolidation of offerings		Behavioral DR operation				
BYOD VPP	Implementation & pilots			Scale up & expand		BYOD VPP operation				
Contracted capacity VPP	Implementation & pilots			Scale up & expand		Contracted Capacity VPP operation				
Zero Carbon Base Case Capacity (MW)	7	15	27	44	64	95	141	201	275	364
Expected Trajectory (MW)	8	26	51	80	To be determined based on cost-effectiveness.					
*High DER Potential Capacity (MW)	22	74	164	254	384	529	724	919	1,114	1,325

*High DER Potential includes 66MW of behavioral DR in 2030.

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12 Month Action Plan

Promote
Marketing, communication & outreach

Solicit
New proven clean technology projects

Launch
Pilot programs

Research
Grid-scale technologies

Execute
Additional detailed reliability studies

Identify
Opportunities for external funding, collaboration & internal savings

Collaborate
With policy makers on the 2030 Zero Carbon Plan

Find
Opportunities for workforce skills development & community involvement in 2030 Zero Carbon Plan

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Extensive outreach & engagement

7 stakeholder workshops
- 270 attendees (Dec. 2020 & Feb. 2021)

3 Customer & Community meetings
- 400 customers
- 336 surveys completed (Dec. 2020)

3 expert panel discussions @ Board Committee meetings
- 11 experts

smud.org/ZeroCarbon & ZeroCarbon@smud.org
- FAQs
- Meeting recordings
- Opt-in for updates
- Video
- Email for feedback

Listserv notification emails
- Proactively customer notification of upcoming zero carbon meetings

Presentations
- External presentations by Board members, CEO & other key staff

External
Internal

CEO communications
- Video blogs
- All hands employee meeting
- Workgroup meetings

Employee resources
- SharePoint site
- Talking points
- 2 Brown bag learning sessions
- 15+ Intranet news stories & updates

Innovation leadership
- Innovation Leadership Team
- Call for employees' innovative ideas
- Centralized hub for idea vetting

Tailored workgroup presentations
- Project team leads @ staff roundtables
- Q&A session

7 Board & Committee meetings
(Dec. 2020 – March 2021)

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Questions?

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Item 11 – 2020 and 2021 Power Content Update

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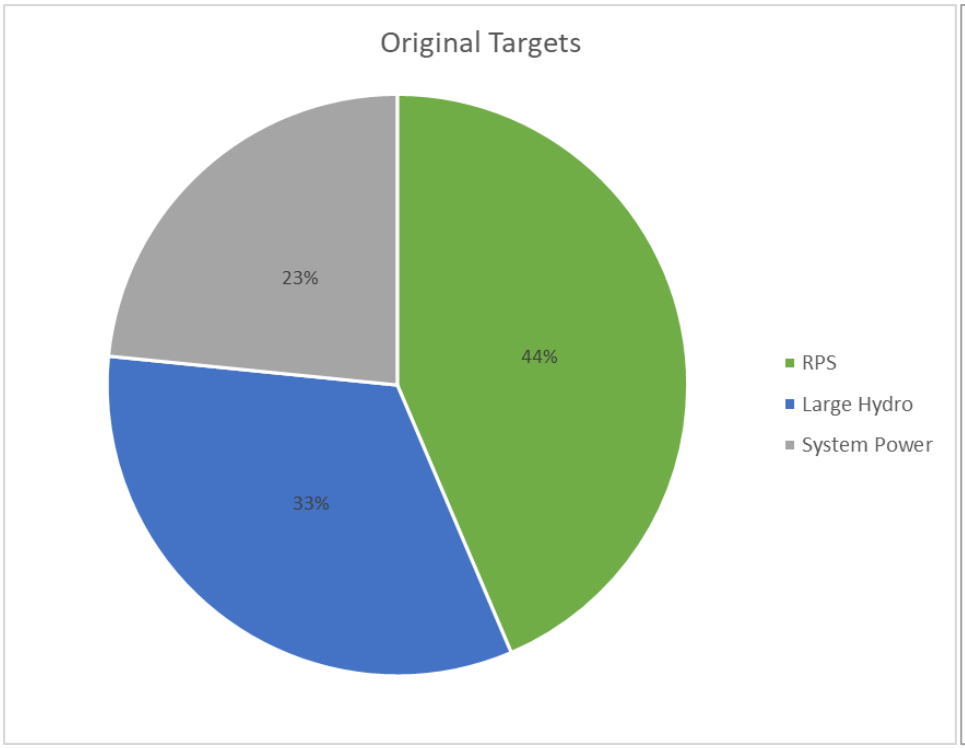
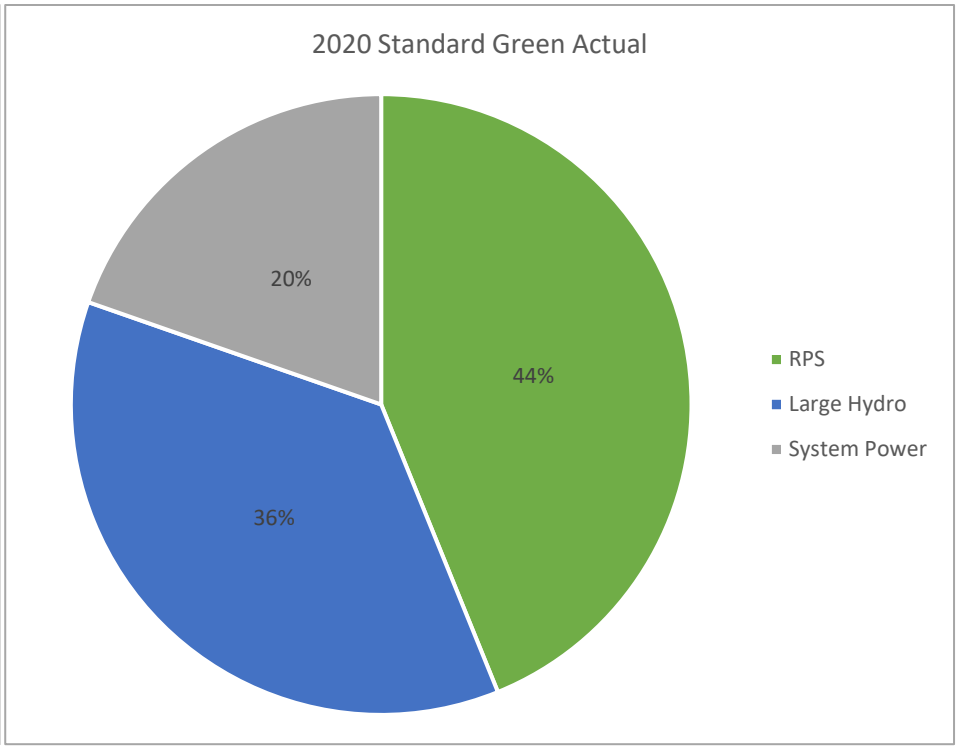
Item 11 - 2020 Targets vs. Actuals





Note: 1,950 MWh UltraGreen load excluded from actuals

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Item 11 - 2020 Renewable Resources

Name	Technology	County	State	Volume
Topaz Solar Farms	Solar	San Luis Obispo	CA	84,012
Biglow Canyon Wind Farm	Wind	Sherman	OR	51,813
Tucannon River Wind Farm	Wind	Columbia	WA	49,768
Centinela Solar Energy	Solar	Imperial	CA	47,714
Mojave Solar	Solar	San Bernardino	CA	26,386
Mt. Poso Cogeneration Facility	Biomass	Kern	CA	15,727
Campo Verde Solar	Solar	Imperial	CA	15,036
Ivanpah	Solar	San Bernardino	CA	9,873
Indian Valley Hydro	Hydro	Lake	CA	9,618
Ivanpah	Natural Gas (CEC Renewable)	San Bernardino	CA	1,002
Total				**310,949**

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1) Volumes above are MWh

Item 11 - 2021 Target

VCEA Retail Load	719,098	
Renewable Supply	**77,458**	**11%**
Aquamarine Solar	23,028	
Indian Valley	1,500	
Putah Creek Energy Farm	930	
Short Term RECs	52,000	
Large Hydro	**79,427**	**11%**
Hydro Contract	29,427	
PG&E Allocation Estimate	50,000	
System Power	**562,213**	**78%**

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1) Above % based on VCE Board policy decision (June 2020)

Item 11 – Evolving Portfolio

VCE Contracted Resources

(1) Aquamarine Solar Facility – Kings Co.
50 MW PV-only
Scheduled online – Q3 2021

2 Yolo County Solar (PV) + Storage Projects
(2) 3 MW/3 MW BESS and **(3)** 20MW/6.5 MW BESS
Scheduled online – Fall 21/22

(4) Tierra Buena Battery Storage Facility - Sutter Co.
VCE share is 2.5 MW
Anticipated online – Summer 2022

(5) Aggregated Demand Response – System wide
VCE share is 7 MW
Anticipated online – Summer 2021

Solar (PV) + Storage Project
(6) Resurgence Solar I – San Bernadino Co.
90 MW (PV) / 75 MW BESS
Scheduled online end 2022

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Item 12 – VCE Three-Year Strategic Plan Update

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Item 12 - VCE Three-Year Strategic Plan Update

Overview

Inform the general manager and CAC of the summarized progress on the VCE Three-Year Strategic Plan goals ratified at the November 12, 2020.

Quarterly Report to VCE Management

- Staff will report quarterly to the Interim General Manager on the status of goals, objectives and metrics for which they are responsible.

Annual Report to Board and CAC Staff

- Staff will report annually to the Board and CAC on the status of goals, objectives and metrics, and will recommend any mitigations or amendments as may be necessary for Board approval.

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Item 12 - Goal 1 - FINANCIAL STRENGTH

Maintain grow a strong financial foundation and manage costs to achieve long-term organizational health.

1.1 - Maintain consistently healthy cash reserves to fund VCE's mission, vision, and goals.
1.2 - Achieve an investment grade credit rating by end of 2024.
1.3 - Commit to fiscal efficiencies to build a program foundation from which to deliver customer and community value.
1.4 - Manage customer rates to optimize VCE's financial health while maintaining rate competitiveness with PG&E.

Obj	Key Developments	Planned Activities
1.1	1. Board Approved Arrearage Management Plan January 2021 2. Drafting Collections Policy	Collections Policy submitted for approval Q3 2021
1.2	1. Participated in CCA educational webinar on establishing credit ratings for CCAs 2. budgeted for financial advisor to support process of establishment of first credit rating	Development Timeline for credit rating by Q3 2021
1.4	1. Updated customer rates in February & March to maintain parity with PG&E 2. CAC Rates Task group to develop additional customer rate option	RFP in development with issuance in Q3 2021

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Item 12 - Goal 2 - PROCUREMENT & POWER SUPPLY

Manage power supply resources to consistently exceed California's Renewable Portfolio Standard (RPS) while working toward a resource portfolio that is 100% carbon neutral by 2030.

2.1 - Continue to identify and pursue cost effective local renewable energy resources.
2.2 - Acquire sufficient bundled energy and renewable resources to achieve VCE's greenhouse gas reduction targets.
2.3 - Deploy storage and other strategies to achieve renewable, carbon neutral, resource adequacy, and resiliency objectives.
2.4 - Identify and pursue cost effective, local distributed energy (e.g., behind the meter rooftop Solar + storage) resources to help meet reliability needs.

Obj	Key Developments	Planned Activities
2.5	In Q1 2021, executed a 90MW PV +75MW BESS 20 yr. PPA which will provide VCE stable low-cost power and resource adequacy.	
2.5	Carbon Neutral Task Group formed and working on developing a scope of work for an outside consultant	RFO to be released by end of April '21

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Item 12 - Goal 3 - CUSTOMERS & COMMUNITY

Prioritize VCE's community benefits and increase customer satisfaction and retention.

3.1 - Develop engagement strategies to increase awareness of, and participation in, local control of VCE's energy supply and programs with a particular focus on engaging disadvantaged and historically marginalized communities.

3.2 - Develop programs and initiatives to better support community goals, including supporting member agency achievement of energy-sector emissions reduction targets.

3.3 - Design and implement a strategy to more effectively engage local business and agricultural customers.

3.4 - Build awareness and trust of the VCE brand through direct engagement with customers, communities and organizations.

3.5 - Develop customer programs and initiatives that prioritize decarbonization, community resiliency and customer savings.

3.6 - Measure and increase customer satisfaction, using tools such as surveys and focus groups, while maintaining an overall participation rate of no less than 90%.

3.7 - Integrate and address the concerns and priorities of emerging and historically marginalized communities in the design and implementation of VCE's services and programs.

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Item 12 - Goal 3 - CUSTOMERS & COMMUNITY – Cont.

Obj	Key Developments	Planned Activities
3.1	4 virtual presentations with Spanish translation; new posts on social media in Spanish; programs survey developed/deployed with special attention to equity issues	
3.2	Provided cost analysis for all member jurisdictions to opt up to UltraGreen	Follow up with city staff
3.4	Staff's goal is to increase website hits by 25% in 2021 (results: 63% increase in sessions; 33% increase in pageviews; 13% increase in Twitter). Initiated a website refresh, integrating feedback. Analyzed Key Accounts spreadsheets for completeness.	Website refresh Completion
3.5	Staff developing a 3-year Programs Plan. Design Criteria and Programs Process Doc in development.	All documents completed and feedback implemented
3.6	First-ever survey for customer feedback developed and deployed. OTG held focus group meeting. Analyzed opt-out process for misinformation vulnerabilities and made changes: customers will now be routed to a CSR to opt out during business hours.	Hold CSR focus group and monitor opt-out trends.
3.7	Operationalized and publicized Arrearage Management Plan (AMP) including new webpage for customers having trouble paying. Finalizing call-out campaign to provide info to customers having trouble paying. Implemented policy of translating all new material into Spanish. Increased Spanish social media posts. Board approved EJ statement, formed Board Subcommittee Working Group. Staff participation in CalCCA Equity Committee.	Monitor AMP participation. Begin call-out campaign Continue posting in Spanish, measure success Dec 2021.

Item 12 - Goal 4 - DECARBONIZATION & GRID INNOVATION

Promote and deploy local decarbonization and grid innovation programs to improve grid stability, reliability, community energy resilience, and safety.

4.1 - Working with a variety of local, regional and state partners, develop a grid innovation roadmap for VCE's service territory that supports community energy resilience and reliability.
4.2 - Develop a VCE decarbonization roadmap to guide near and long-term program decisions and offerings.
4.3 - Increase participation in VCE's UltraGreen 100% renewable product.
4.4 - Identify external funding sources to support decarbonization and grid-related programs and initiatives.

Obj.	Key Developments	Planned Activities
4.1	Worked w/ the CAC on a building electrification statement. The Board adopted a statement supporting and encouraging electrification of new buildings.	
4.3	Generated and shared UltraGreen analysis with member jurisdictions.	

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Item 12 - Goal 5 - REGULATORY & LEGISLATIVE AFFAIRS

Strongly advocate for public policies that support VCE's Vision/Mission.

5.1 - Work with CalCCA and other partners to proactively engage State regulators, legislators, and other State authorities in developing policy that furthers VCE's mission and facilitates our contributions to decarbonization, grid reliability, energy resiliency, affordability, local programs and social equity.
5.2 - Develop relationships with community stakeholder organizations that foster support for VCE's mission and vision.
5.3 - Optimize regulatory compliance activities.

Obj	Key Developments	Planned Activities
5.2	Identify key stakeholder groups within VCE service territory – in process,2. Attended Winters Chamber of Commerce on 4.12.213. Met with Cool Davis to explore formalizing a relationship to work on shared decarbonization and electrification goals.	Initial Stakeholder list by end of Q2 21 Decision around structure to formalize (e.g. MOU)
5.1	Actively engaged in CalCCA sponsored legislation on PCIA – SB 612 (Portantino) Active support of AB 843 (Aguiar-Curry) – access for CCA's to BioMat resources3. CAC Leg/Reg Task Group – bi-weekly meeting	
5.3	Plug in specific regulatory goals for 2021 - from CalCCA, Including Regulatory Staffing in FY 21-22 budget proposal	

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Item 12 - Goal 6 - ORGANIZATION, WORKPLACE & TECHNOLOGY

Analyze and implement optimal long-term organizational, management, and information technology structure at VCE.

6.1 - Develop a roadmap to evaluate and guide future steps toward formation of a local Publicly Owned Utility (POU).
6.2 - Evaluate and pursue opportunities for shared services with other CCAs for certain functions.
6.3 - Develop an evaluation framework to guide future expansion opportunities beyond the existing service territory.
6.4 - Identify optimal management, staffing and contracting structure of VCE in the near and long term; factors include balance of internal staff vs. consultant support services, transition of leadership positions to permanent internal employees.
6.5 - Promote diversity, equity and inclusion in leadership, hiring, promotion, and contracting policies.
6.6 - Support health, wellness and a productive workplace.
6.7 - Create an innovation-focused culture that rewards proactive participation, problem solving, new ideas, and creative use of partnerships.
6.8 - Deploy a modernized IT infrastructure that enables knowledge management, analytics and collaboration through robust use of data and information resources.

Obj.	Key Developments	Planned Activities
6.1	Engaged Don Dame to prepare process outline – technical steps Outreach to CMUA	
6.2	Joined CC Power – "Super JPA" for joint procurement with other CCA's Outreach to City of Stockton RE: City's feasibility study	
6.3	Research other CCA expansion evaluation methods in process.	
6.4	Onboarding Director of Finance & Internal Operations	Budgeted (1) half time regulatory Analyst and (1) Intern for Marketing and Support
6.8	Working with County of Yolo GIS team on developing VCE platform for Dashboarding and GIS Mapping	

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