



## **Peninsula Clean Energy and Local Programs**

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Approved by Peninsula Clean Energy  
Citizens Advisory Committee on January 18<sup>th</sup>, 2018

## Introduction

During the launch phase (the first year or two), Community Choice Energy (CCE) programs concentrate upon hiring staff, and acquiring electricity, both renewable and non-renewable, from remote locations via long-distance transmission lines. This stage, sometimes referred to as CCE 1.0, is a time for a program to become established operationally and financially.

Once a CCE organization is underway however, it can move into a second stage, sometimes called CCE 2.0. In this stage, CCEs can start developing local programs that further reduce their service areas' carbon emissions, create new local jobs, increase their visibility and generate new revenue. The technical name for such programs is "Distributed Energy Resources." DERs include a variety of energy generating and energy saving services and technologies that can be provided locally by a CCE program and its member jurisdictions. In addition to directly benefiting a CCE program, DERs can also benefit the overall energy system by reducing pressure on the electricity grid thereby helping avoid costly upgrades to grid infrastructure.

DERs are often located close to demand centers, to minimize impacts from broader power outages. Also, DERs typically are more flexible, and have faster response times, than traditional generation facilities. The diversity of these numerous smaller and distributed resources can provide greater grid reliability and stability than centralized fossil-fuel power plants. Furthermore, one study indicates DERs can reduce the cost of electricity by up to 50%.<sup>1</sup>

### Primary types of DER

- **Distributed Generation** – renewable energy generated in or nearby a CCE's service area – e.g. residential rooftop, community-scale installations, or utility-scale solar installations.<sup>2</sup>
  - For example, Marin Clean Energy has six local solar projects on line or under construction.
- **Energy Storage deployment** – employing batteries, including electric vehicles, and other devices.<sup>3</sup>
- **Local Micro-Grid development** – e.g. to increase resilience at hospitals, community service centers, and other institutions<sup>4</sup>
- **Energy Efficiency measures** – for homes, commercial buildings and industrial facilities.
  - Marin Clean Energy has a proposal before the California Public Utilities Commission (CPUC) to become the Program Administrator (replacing PG&E as the default provider) of energy efficiency programs in its service territory.

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<sup>1</sup> Megan Geuss, "[Distributed energy sources can reduce cost of electricity up to 50%, study says](#)", article in *ars technica*, citing study published in *Nature*, "[Data-driven planning of distributed energy resources amidst socio-technical complexities](#)", July 17, 2017.

<sup>2</sup> A CCE program may choose to purchase some of this electricity using Feed-in Tariffs or through its standard power procurement process.

<sup>3</sup> Energy storage is increasingly being deployed in conjunction with distributed generation.

<sup>4</sup> Often done in tandem with distributed generation and energy storage.

- **Demand Response programs** – utilizing both hardware and software, that enable utilities (and CCEs) to efficiently manage electricity flows to take advantage of when prices are lowest or to reduce grid congestion, using home and business energy management systems.
- **Cogeneration**—also known as combined heat and power, enables the heat normally lost in power generation to be recovered for heating or cooling.

**One cogent strategy involving DERs is fuel switching**., which typically involves shifting from gas power to electric power in homes and businesses, and also replacing gasoline-powered vehicles with EVs.<sup>5</sup>

- For example, Sonoma Clean Power recently teamed with Nissan and BMW to offer rebates on EV purchases.
- Another example being considered by a number of CCEs is heat pumps, which have great potential in California.

There are a lot of DER options to choose from so it is important for a CCE to develop some criteria to help it select the local programs that are best for it. As DER aggregation<sup>6</sup> from different points of interconnection to the distribution grid (sold in the wholesale market in aggregate) becomes widespread, a single virtual point of interconnection will enable even greater DER integration for larger and more diverse local programs.

Also, government policy-makers at the California Public Utilities Commission (CPUC), California Energy Commission (CEC), and the California Independent System Operator (CAISO) are focusing on determining the locational and temporal net benefits of DERs, which will (along with several other regulatory proceedings) be utilized to establish DER guidelines directly impacting CCE programs.

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<sup>5</sup> This activity is often called “electrification.”

<sup>6</sup> A DER Provider, as defined by the California Independent System Operator (CAISO), is a market participant that aggregates one or more small distribution-connected energy resources totaling at least 0.5 MW, from either in front of, or behind, the customer meter.

## **DER Projects in Existing Community Choice Energy programs**

### ***Partial List***

#### **Marin Clean Energy**

- Net Energy Metering – Pays premium rates (1 cent per kWh above MCE retail rate) for production exceeding usage and rolls over excess credits every month. MCE’s approximately 3,000 customers received over \$1 million in 2015-16.
- Energy and Water Efficiency – Partners with Rising Sun Energy to offer no-cost (valued at \$3,000-\$5,000) energy and water assessments, no-cost technical assistance, and installations for residents of selected cities in MCE’s service area.
- Local Renewable Energy generation— 19 MW of renewable energy is online or under construction in service area including:
  - 10.5 MW solar farm in Richmond (Solar One Project) on Chevron brownfield site. Projected to power 3,400 homes, with 340 jobs created including youth trainees from Richmond Build
  - 2 MW FIT solar project at Freethy Industrial Park in Richmond to power 600 homes in partnership with Richmond Build; estimated 20-year revenue of \$10+ million
  - 1 MW solar carport in Novato constructed by 25 IBEW workers employed by Cupertino Electric to power 300 homes
  - 1 MW solar project at Novato Cooley Quarry to power 300 homes.
  - 1 MW solar project at San Rafael Airport to power 300 homes.
  - 265 KW FIT solar project at Cost Plus Plaza roof in Larkspur – 90 homes; estimated 20 year revenue of \$1+ million
  - 3.9 MW landfill gas conversion project (methane to electricity) at Redwood Landfill in Novato (partner with Waste Management) to power 5,000 homes
- Smart Electric Vehicle Charging program
  - Partners with eMotorWerks to increase affordable renewable EV charging options to accelerate EV adoption
    - Provides discounts on smart grid-enabled charging stations
    - Offers cash-back rewards for EV charging at times when electricity demand is high
- Feed-In Tariff
  - Fixed price per kWh for 20 years for local small developers
  - Prices gradually decline as capacity approaches MCE Board’s 15 MW cap
  - Three price categories: Peak, Baseload, and Intermittent

- Building Energy Efficiency Optimization
  - CEC “Local Government Challenge Grant” for \$1.7 million
  - Various DER technologies being installed, including high-efficiency heat-pump water heaters, LED lighting, energy storage, solar, insulation upgrades, methane gas capture/anaerobic digestion, & electric vehicle charging.
  - Partners include Center for Climate Protection, Association for Energy Affordability, TerraVerde Renewable Partners, & Pathion
- Demand Response Pilot: “My Energy Insight” field trial
  - Remote management of home and business electricity loads
  - Uses AutoGrid’s Flex Demand Response Optimization and Management System (DROMS)
  - Reducing load during peak periods via DROMS for smart thermostats, pool pumps, water heaters, EV chargers, & energy storage

### **Sonoma Clean Power**

- Drive Evergreen [2016 program] – partnered with eMotorWerks to accelerate EV adoption
  - Provided 1,000 free smart EV charging stations to SCP customers
  - Nissan and BMW offered \$10,000 rebates on EV purchases – including a higher rebate for low income customers
  - Offered over 500 customers two levels of discounts: \$5,000 for customers participating in California Alternate Rates for Energy (CARE) or Family Electric Rate Assistance (FERA) and \$2,500 for other applicants to purchase EVs
  - 206 EV’s were sold or leased
  - Budgeted \$1.2 million for program but spent only \$630,000 on incentives
  - Assessment that customers unhappy with only two EVs to choose from
- Drive Evergreen [2017 program]
  - EV purchase or lease of nine models from seven dealerships (BMW, Chevrolet, Ford, Kia, Mercedes Benz, Nissan and Tesla)
  - In addition to dealer and manufacturer credits, SCE offers incentives up to \$3,500 for new vehicles and \$2,500 for used vehicles
  - Also an additional \$2,000 rebate for low/moderate income buyers. For instance, the e-Golf hatchback with a 124 mile range lists for \$28,995 but the full incentive/rebate/tax credit package of \$19,000 cuts the (low income consumer) price to \$9,995
  - Incentive provided to Transportation Network Company drivers (e.g. Uber, Lyft) for number of “fare miles” driven in their EV.
  - SCE’s budget for this year’s program is \$1.5 million.

- EV Charging equipment for homes
  - Free replacement of home chargers lost in recent fires in service area
  - Up to 1,000 free smart chargers (from partner eMotorWerks) – customer pays for shipping and installation
  - \$150 rebate for customers signing up for “Clean Charge Program” software that enables SCP to charge EVs at times when electricity is less expensive
  - Customers can participate in JuiceNet Rewards Program-- for customers who avoid charging during peak periods.
- Net Green
  - A NEM program that allows customers to install solar panels (or other renewable energy system) on their homes
  - Customers receive compensation at retail rate plus 1¢/kWh (like PCE & MCE)
- ProFIT Program (FIT)
  - Promotes the development of small-scale renewable energy and enables the developers to sell the electricity to SCP.
  - Projects must be less than 1 MW, located in service area and locally permitted
  - SCP pays participants \$95/mWh
  - Ten and twenty year contracts
  - Includes three FIT projects, one near Cloverdale and two near Petaluma, which can supply electricity for 1,000 homes over 20 years
  - Issues: People with small solar systems often have little experience, and they are often on county land, requiring adjustments in zoning.
- DIY Toolkits
  - SCP provides supplies and equipment that help to measure & reduce residential and commercial electricity and water consumption
  - Equipment (e.g. Kill-a-Watt meters and infrared thermometers) is available for loan at local libraries (must be returned after use)

### **Lancaster Choice Energy (City of Lancaster)**

- Local Renewable Energy
  - 10 MW solar farm at Western Antelope Dry Ranch using solar tracking mounts - completed in December 2016 in partnership with sPower
- Streetlight Electric Vehicle (EV) Charging demonstration
  - Streetlights on City’s main boulevard equipped with ebee smart chargers
  - Grant from the Antelope Valley Air Quality Management District (AVAQMD) for 80% of the total project cost
  - Remaining 20% of costs covered by private sponsors, including EasyCharge and eluminocity
- Zero Net Energy Home Ordinance
  - Approved by CEC and goes into effect on January 1, 2018
  - Mandates the installation of a solar system equivalent to two watts per square foot on each new home built in the city.

# Selected Distributed Energy Resources Projects at Major California Municipal and Investor-Owned Utilities

## City of Palo Alto Utilities

### Green Living Resources

- One-stop catalog of residential programs, rebates, & resources
  1. Whole-Home Comfort
    - Home Efficiency Genie
    - Smart Powerstrip Rebate
    - Attic Insulation Rebate
    - Whole House Fan Rebate
    - Workshops
  2. Kitchen & Bathroom
    - Free Water-wise Indoor Survey kit
    - Heat Pump Water Heater Rebate
  3. Yard & Landscaping
    - Landscape Efficiency
    - Pool Pump Rebate
    - Stormwater Rebates
  4. Renewable Energy
    - Carbon Neutral Electricity & Gas
    - Solar PV Net Metering
    - Solar Water Heating Rebate
  5. Transportation
    - EV Chargers for Organizations Rebate
  6. Bill Pay Assistance
    - Residential Energy Assistance Program
    - Project PLEDGE

### Distributed Generation

- Feed-in Tariff—Palo Alto CLEAN
  1. Standardized long-term fixed rate Power Purchase Agreement (PPA)

### EV Charging

- Solar Canopies on top of public parking garages
  1. About 100 Level-2 EV charging ports

### Electrification

- Examining electrification of space heating and water heating using heat pumps. Title 24 2019 code updates (effective 1/1/20) should improve the cost effectiveness of heat pumps vs. natural gas

## Sacramento Municipal Utility District

### Local Renewable Energy Generation – built and operates:

- Solano Wind Farm – three 660 KW wind turbines
- South Fork Powerhouse (American River) – up to 400 KW hydro

### **Community Solar Development**

- Assists non-profit organizations in service area install rooftop solar
- Provides solar panels for installation on selected low income housing developments in service area

### **Electric Vehicle Promotion**

- Provides an online “Estimator Tool” that compares the cost to buy and drive an EV vs. a gas powered vehicle
- Provides a \$599 incentive for new EV owners to charge free for two years or an additional 1.5¢ kWh credit for charging an EV between midnight and 6 am.
- Provides free high powered EV chargers for residents who purchase or lease EVs
- Provides solar powered fast charging stations at six locations

### **Energy Efficiency – offers rebates on:**

- Installing reflective “cool roofs” on homes
- HVAC replacement (central air conditioning and/or heat pumps)
- Room air conditioners
- Whole house fans
- Smart thermostats

### **SMUD Energy Store (on line) – discounted products**

- Nest thermostats
- Rechargeable devices
- LED lights – large selection
- Advanced power strips

### **Solar Regatta**

- Annual event at which students design and race solar powered boats

## **Los Angeles Department of Water & Power (LADWP)**

- **Solar Incentive Program**
  1. Over \$305 million incentives paid, \$12 million remains
  2. Over 27,000 LADWP customers participating, totaling over 214 MW of net metered solar capacity
- **Feed-in Tariff**
  1. LADWP buys 100% of mostly solar energy through 20-year PPA
  2. SB 1332 required minimum of 75 MW, LADWP offering 150 MW
- **Community Solar Program**
  1. LADWP will install 2-4 kW system on 1,000 rooftops
  2. Customer receives \$360 per year
  3. Expected program launch in 2018
- **Energy Storage**



1. In compliance with AB 2514, 44 MW at distribution level, 178 MW total by 2021
2. Several distributed energy storage projects at various facilities are in the planning stage

## **PG&E**

### **Distributed Generation**

- Feed-in Tariff
  1. Renewable Market Adjusting Tariff (ReMAT—up to 3 MW)
  2. Bioenergy Market Adjusting Tariff (BioMAT—up to 3 MW)
- Renewable Auction Mechanism (3 MW+)
  1. Streamlines procurement process by:
    - Allowing project bidders to set own price
    - Providing simple standard contract for each utility
    - Expedited regulatory review process
- Bioenergy Renewable Auction Mechanism (BioRAM)
  1. Bioenergy from forest fuel from High Hazard Zones (HHZ) to mitigate the threat of wildfires
- Net Energy Metering
  1. Bill credit for excess generation exported to grid, compensated at retail rate in real time, & true-up every 12 months at Default Load Aggregation Point (DLAP), approximately 3-4 cents per kWh
  2. Virtual Net Metering (VNM) available to multitenant properties, allocating solar system production credits proportionally to each tenant at percentage of system capacity owned
  3. NEM Aggregation (NEMA) allows a customer-generator to aggregate electrical load from multiple meters, & the NEM credits are shared among all property attached or adjacent to the generation facility
  4. Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) enables local governments & universities to share generation credits from a system located on one government property with billing accounts on other government properties.
  5. NEM Fuel Cell (NEMFC) permits fuel cells using non-renewable fuels, but meeting CPUC GHG standard, to receive credits
- Green Tariff Shared Renewables (AKA Community Solar)
  1. PG&E “Renewable Choice” & “Solar Choice” (just 22 MW)
- California Solar Initiative (now closed)
- Self Generation Incentive Program offers rebates to residential, commercial, industrial, government, and non-profit customers for qualifying DG

### **Energy Efficiency**

- Residential Pay-for-Performance Pilot Program (2017)
  1. Utilizing smart meters & CalTRACK to determine payable energy savings, instead of post-evaluation estimated average savings
  2. Aggregators pay incentives to users, & PG&E pays aggregators for measured savings

3. Encourages innovative solutions based on actual savings instead of relying on average savings for given asset (calculated by Evaluation, Measurement, & Verification) regardless of users' actions
- Rebates
    1. Often under-subscribed, due to time-consuming complex processes
    2. Now, combining metered energy data with on-bill financing
    3. Current rebates include electric water heaters (\$300), gas water heaters (\$125), smart thermostats (\$50), and pool pumps (\$100)
  - SmartRate Program
    1. Reduced rates in exchange for minimizing usage up to 15 days per year
  - SmartAC Program
    1. SmartAC device installed on AC unit enables PG&E to reduce AC usage during critical peak periods between May 1 – October 31
    2. Customer paid \$50 as incentive
  - AC Quality Care Program
    1. Participating contractor assesses customer AC system, and customer chooses which repairs, if any, to be undertaken
    2. Customer receives up to \$450 rebate
  - Energy Savings Assistance Program
    1. Limited income customers living in residence at least 5 years qualify for financial assistance for energy efficiency products and programs
  - Home Upgrade Options
    1. Develop overall plan for EE upgrade projects, with input from Energy Upgrade California, and receive up to \$5,500 in rebates
  - Zero Net Energy Buildings
    1. California Advanced Homes Program (CAHP), California Multifamily New Homes Program, & CAHP Master Builder initiative provide support for residential builders
    2. Incentives, design assistance, verification support, and recognition for constructing buildings beyond code requirements & on pathway to ZNE
    3. PG&E ZNE outreach activities include workshops and education
    4. Technical research including community-level DER to achieve ZNE
  - Home Energy Management & Business Energy Management Partnerships Including OPOWER, Bidgely, Greenely Go, Home Energy Analytics

### **Demand Response**

- Shape, Shift, Shimmy, & Shed: California's New Demand Response Strategy
- Demand Response Auction Mechanism (DRAM)
  1. DRAM enables DER aggregators to offer services to LSEs & grid market
  2. DR offered as kW-months of capacity, or ability to reduce/add energy for up to 4 contiguous hours during peak period
  3. Pay-as-bid auction: each vendor receiving their bid rather than a single clearing price, which discourages underpricing & reveals true DER costs
  4. First customer-based Virtual Power Plants in USA
  5. Winning PG&E bidders included OhmConnect, AutoGrid, EnerNOC, Tesla, and Sunrun, for total capacity of about 80 MW in 2018 & 90 MW in 2019
- Click-through authorization processes streamlining customers' ability to authorize utility to share energy use data with 3<sup>rd</sup>-party DR providers
- Standard DR Programs

1. Peak Day Pricing
2. Base Interruptible Program
3. Scheduled Load Reduction Program
4. Optional Binding Mandatory Curtailment Program
5. Capacity Bidding Program
6. Automated Demand Response Incentive
7. Permanent Load Shift
8. Third Party Offers—Rule 24 (3<sup>rd</sup> party DR providers solicit PG&E customers to participate in DR programs for wholesale market)

### **Energy Storage**

- Three storage DER demonstration projects located in San Jose including 150 residential and 10 commercial customers, were expected to end by 1/1/18
  1. Funded by CPUC Electric Program Investment Charge (EPIC)
  2. Partners include: Tesla, residential battery system and software; Enphase, smart inverters at customer sites enabling grid optimization aggregation service; Green Charge, energy storage to store energy during off-peak and supply to grid during peak; and GE, Distributed Energy Resource Management System (DERMS) software using Smart Energy Profile 2.0 to enable monitoring & coordination of DERs with DER aggregators
- New (12/6/17) DER storage contract with EDF (France) for 40 MWh
  1. EDF will build, own, & operate behind-the-meter batteries for PG&E commercial & industrial customers
  2. Lower customer bills by demand charge reductions, maximizing off-peak consumption, & collecting revenue from wholesale market participation

### **Electric Vehicles**

- PG&E authorized (Phase 1) by CPUC to build infrastructure for multi-unit dwellings, workplaces, and public interest destinations, with \$130 million budget
  1. “EV Charge Network” expected in 2018, with 7,500 charging stations
  2. Minimum of 15% charging stations in disadvantaged communities
- Low Carbon Fuel Standard Rebates for PG&E customers using plug-in EVs
- Time-of-use rates for residential customers with EVs
- Plug-in EV (PEV) Submetering pilot uses energy meters to save on fuel costs and avoid paying for new PEV meter, currently in Phase 2 through 4/18
- Demand Response Pilot: PG&E BMW iChargeForward Pilot
  1. Customers shift use off-peak in response to incentives & price signals
- PG&E now proposing (Phase 2) \$20 million for “priority reviews” and \$233 million for two five-year EV charging infrastructure construction programs
  1. Focused on medium & heavy duty vehicles (MHDVs) and direct current fast chargers
  2. Priority reviews would include converting MHDVs to EVs; school buses charging at mid-day during excess solar power supply; online resource to serve EV customers; and transportation electrification projects
  3. EV charging infrastructure program, Fleet Ready, would build 700 make-ready EV stations for MHDVs
  4. Fast Charge program would build up to 234 direct current fast chargers at 52 public sites

## **Southern California Edison (SCE)**

### **Grid Modernization for DER**

- White Paper: “The Clean Power and Electrification Pathway”
  1. Requesting \$2.1 Billion to modernize grid & integrate DERs
  2. Advanced distribution automation; DER performance validation; DER market design & development

### **Distributed Generation**

- Feed-in Tariff
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- Renewable Auction Mechanism (3 MW+)
  1. Streamlines procurement process by:
    - Allowing project bidders to set own price
    - Providing simple standard contract for each utility
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- Bioenergy Renewable Auction Mechanism (BioRAM)
  1. Bioenergy from forest fuel from High Hazard Zones (HHZ) to mitigate the threat of wildfires.
- Net Energy Metering
  1. Bill credit for excess generation exported to grid, compensated at retail rate in real time, & trued-up every 12 months at Default Load Aggregation Point (DLAP), approximately 3-4 cents per kWh
  2. Virtual Net Metering (VNM) available to multitenant properties, allocating solar system production credits proportionally to each tenant at percentage of system capacity owned
  3. NEM Aggregation (NEMA) allows a customer-generator to aggregate electrical load from multiple meters, & the NEM credits are shared among all property attached or adjacent to the generation facility
  4. Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) enables local governments & universities to share generation credits from a system located on one government property with billing accounts on other government properties
  5. NEM Fuel Cell (NEMFC) permits fuel cells using non-renewable fuels, but meeting CPUC GHG standard, to receive credits
- Green Tariff Shared Renewables (AKA Community Solar)
  1. SCE Green Rate (just 7.05 MW)
- California Solar Initiative (now closed)
- Self Generation Incentive Program offers rebates to residential, commercial, industrial, government, and non-profit customers for qualifying DG

### **Energy Efficiency**

- Energy Upgrade California
  1. Incentive funds depleted as of 9/29/17; new funds as of 1/18
  2. Home Upgrade Package: up to \$3,000
  3. Advanced Home Upgrade Package: up to \$5,500
- Other EE Incentives & Rebates

1. Rebates include smart thermostat (\$125), air conditioner (\$750), variable speed pool pump & motor (\$200), evaporative cooler (\$400), hybrid electric heat pump water heater (\$200), window evaporative cooler (\$200)
- Business Energy Advisor
  1. Free consulting service: “Continuous Energy Improvement”
  2. Monitor energy use with “Energy Benchmarking” & “SCE EnergyManager”
- Express Solutions
  1. Upgrades of existing equipment to more efficient options available to all business customers, up to 100% of project’s cost
- Customized Solutions
  1. Tailored equipment upgrades with incentives based on energy use over 12 months, up to 50% of project’s cost
- New Construction
  1. Savings By Design: financial incentives, detailed analysis, & design support for high performance non-residential building design
  2. California Advanced Home Program (oversubscribed in 2016 & closed)
- On-Bill Financing for energy efficient projects: Zero interest & no fees

### **Demand Response**

- Demand Response Auction Mechanism (DRAM)
  1. SCE winning bidders in 2018 & 2019 include OhmConnect (60 MW), Enerwise (35 MW), Ecofactor (500 kW), Green Charge (500 kW), and Tesla (340 kW)
  2. 500 kW is minimum size to participate in CAISO Reliability Demand Response Resource project
  3. Prices paid by CAISO for day-ahead market, but in future may be based on real-time prices too
  4. DRAM enables new types of DR (e.g. energy storage) from grid’s edge, and allows grid operators to test performance of an aggregation of a variety of customers and products
- Click-through authorization processes streamlining customers’ ability to authorize utility to share energy use data with 3<sup>rd</sup>-party DR providers
- Standard DR Programs
  1. Critical Peak Pricing
  2. Agricultural & Pumping Interruptible Program
  3. Automated Demand Response
  4. Permanent Load Shifting
  5. Time-of-Use Base Interruptible Program
  6. Capacity Bidding Program
  7. Demand Bidding Program

### **Energy Storage**

- SCE has over 400 MW of energy storage under contract in 2017, but mostly in front of meter and for utility scale
- Preferred Resource Pilot includes 75 MW of battery energy storage as part of 136 MW to meet electricity demand in Orange County with reliability of a power plant, from following developers:
  1. Advanced Microgrid Solutions: 40 MW of DR from energy conservation & battery storage
  2. Convergent: 35 MW of battery storage

3. Hecate: 15 MW of battery storage
4. NextEra: 10 MW of battery storage & 10 MW of DR from energy conservation & battery storage
5. NRG: 10 MW of solar plus battery storage
6. Swell: 5 MW of DR from battery storage, provides and installs storage packages for about 3,000 residential consumers. Combination of lithium-ion battery and software system for the home.

### **Electric Vehicles**

- SCE authorized (Phase 1) to build infrastructure for multi-unit dwellings, workplaces, and public interest destinations, with \$22 million budget
  1. “Charge Ready” network began in 2017, with 1,500 charging stations
  2. At least 10% of charging stations in disadvantaged communities
- Low Carbon Fuel Standard Rebates for SCE customers using plug-in EVs
- Time-of-use rates for residential & commercial customers with EVs
- Plug-in EV (PEV) Submetering pilot uses energy meters to save on fuel costs and avoid paying for new PEV meter, currently in Phase 2 through 4/18
- Demand Response Pilot: SCE “Smart Charging Pilot”
  1. Customers shift use off-peak in response to incentives & price signals
- Department of Defense Vehicle-to-Grid Pilot
  1. SCE partnering with Los Angeles Air Force Base in pilot allowing EV2G
  2. EVs as storage: charging when prices are low, discharging during supply constraints
  3. Fleet of 34 EVs and hybrids. Project continued through 9/17
- SCE now proposing (Phase 2) \$19.45 million on six “priority review” pilots & \$553.8 million on a five-year charging infrastructure project
  1. Priority review projects include “make-readies” for cranes, tractors, buses; ride share pilot; residential customers and light duty EVs
  2. Standard review projects include charging infrastructure for medium and heavy duty vehicles (MHDVs) and small pilot for direct current fast chargers (DCFCs)

### **San Diego Gas & Electric**

#### **Distributed Generation**

- Feed-in Tariff
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  - California Solar Initiative (now closed)
  - Self Generation Incentive Program offers rebates to residential, commercial, industrial, government, and non-profit customers for qualifying DG

### **Energy Efficiency**

- Residential Programs
  1. Energy Upgrade California offers energy efficiency assistance & incentives for home improvement
  2. Energy Management: Green Button programs for energy & cost alerts
  3. Rebates: include lighting, washers (\$25), electric heat pump & water heaters (\$350), gas water heaters (\$100), pool pumps (\$200), & smart thermostats (\$75)
  4. Increase energy efficiency of heating & cooling systems: initial assessment of HVAC and guidance for new installation & retrofits, with rebates up to \$1,250
  5. Residential Energy Efficiency Loan Assistance Program
- Business Programs
  1. Instant Lighting Rebates
  2. Other rebates include: foodservice equipment
  3. Business Energy Solutions offers rebates for customers with demand less than 200 kW
  4. On-bill Financing: repay loans via utility bill with no interest or fees
  5. 3<sup>rd</sup> Party Financing: innovative options with increased access to credit

### **Demand Response**

- Demand Response Auction Mechanism (DRAM)
  1. DRAM contracts with OhmConnect (4 MW), AutoGrid (1.7 MW), Green Charge (1 MW), NRG (6 MW), Stem (1.2 MW)
  2. Contract with OhmConnect is unprecedented aggregated behavioral demand response project, providing electricity from homeowners within 20 minutes, for resource adequacy
- Click-through authorization processes streamlining customers' ability to authorize utility to share energy use data with 3<sup>rd</sup>-party DR providers
- Standard DR Programs

1. Base Interruptible Program
2. Capacity Bidding Program
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4. Small Business Real-Time Energy Manager
5. Permanent Load Shifting

### **Energy Storage**

- Sempra Energy (SDG&E parent) partnering with OSIsoft and UC San Diego to pilot DER management software
  1. Includes battery-backed wind farm, solar, EVs, and DR
- SDG&E has over 100 MW of energy storage, but just getting started with distributed energy storage

### **Electric Vehicles**

- SDG&E authorized (Phase 1) to build infrastructure for multi-unit dwellings, workplaces, and public interest destinations, with \$45 million budget
  1. "Power Your Drive" network began in 2017, with 3,500 charging stations
  2. At least 10% of charging stations in disadvantaged communities
- Low Carbon Fuel Standard Rebates for SDG&E customers using plug-in EVs
- Time-of-use rates for residential & commercial customers with EVs
- Plug-in EV (PEV) Submetering pilot uses energy meters to save on fuel costs and avoid paying for new PEV meter.
- SDG&E now proposing (Phase 2) six "priority review" projects for \$18.19 million and another \$225.9 million for residential charging.
  1. Six priority projects include charging infrastructure at San Diego airport and San Diego port, as well as infrastructure and smart charging for a vehicle fleet owner, and numerous Level 2 and direct charge fast chargers.
  2. The "standard review" projects of \$225.9 million include extending the previous public charger installation program to 90,000 Level 2 chargers for single-family homes

### **Microgrid**

- Borrego Springs Microgrid
  1. Unbundled utility microgrid, in which distribution assets owned by SDG&E, but DERs are owned by customers
  2. Purpose is to demonstrate "proof-of-concept" for integration of information technologies and DERs to increase grid efficiency and reliability
  3. Partners include Lockheed Martin, IBM, Advanced Energy Storage, Horizon Energy, Oracle, Motorola, Northwest National Labs, and UC San Diego
  4. Total grid capacity of about 4 MW, including 1.8 MWE diesel generators, 500 kW/1500 kWh battery, three 50 kWh batteries, six 4 kW/8kWh energy storage units, 700 kW PV rooftop solar, and 125 residential home area network systems

### **DER Providers (DERP)**

- CAISO's new market for wholesale distributed energy aggregation



1. Allows DERPs to propose aggregations of 500 kW to 10 MW that can meet day-ahead and hourly energy markets, or faster-responding ancillary services markets`
2. At least four companies applying:
  - a. SDG&E: proposed 3-4 MW aggregation of energy storage sites in 2018
  - b. Apparent Energy: partnering with Silicon Valley Power and Palo Alto municipal utility for two aggregations of 1-1.5 MW each, in 2017, but business case in SVP territory not feasible
  - c. Galt Power: discussing partnership with several entities to aggregate renewables and small-scale storage
  - d. Olivine: possible partnership with CCAs, munis, and resource owners

## **Criteria used to choose among various DER options**

**Here are the criteria tentatively identified by Peninsula Clean Energy staff:**

Proposals would be required to address these criteria:

- Reduces GHG emissions
- Cost effectiveness (to keep ECO plus rates lower than PG&E)
- Number of customers served
- Geographic diversity in San Mateo County communities served
- Supports PCE's workforce policy (that has multiple sub-criteria including prevailing wage, working with local companies, and more)
- Helps PCE match supply to load, e.g. addresses duck curve
- PCE Implementation Requirements (for example, staff time needed)

Proposals could add points by addressing these criteria:

- Contributes toward goal of creating 20 MW of new local power by 2025
- Contributes toward goal of 100% GHG-free power for 2021
- Contributes toward goal of 100% renewable energy by 2025
- Benefits disadvantaged communities
- Helps inform customers about PCE
- Innovative, scalable, and replicable
- Supports community resilience
- Fills a gap in current utility offerings

**Here are the criteria tentatively identified by Silicon Valley Clean Energy staff:**

- GHG reduction – directly measurable and attributable carbon reduction (and addressable potential)
- Unit Cost – SVCE unit cost of GHG reductions, after leverage of third party resources
- Time to Value – speed, level and likelihood of achieved customer value
- Grid Performance – improved grid resources and demand alignment to optimize use of clean energy
- Community Engagement – local stakeholder sponsorship, beneficial visibility within the community
- Market Transformation – uniquely addresses critical need(s) in development of essential new markets

## Appendix

### Silicon Valley Clean Energy's suggested local programs using the above criteria:

- Greenhouse Gas Inventory – Collect GHG data (energy and transportation emissions) in service area to document 2015 baseline and establish targets for further reductions
- Connected Homes Energy and Demand Management – Reduce GHG emissions through home energy management by curtailing electric load during summer peaks and reducing gas heating during winter to reduce natural gas consumption. Using rebates and automated home thermostats.
- Commercial Demand Management – Mirror existing PG&E demand response program, called Peak Day Pricing, including penalties for using more electricity on peak event days and rewards for minimizing usage when grid is congested.
- Multiple Unit Dwelling (MUD)/Workplace EV Charging Assistance – Implement 100 charging points at ten sites vetted for meter location, parking location, ADA, and feasibility.
- EV Pilot Program – Work with dealers to provide rebates for EVs and develop a user-friendly platform for customers to purchase or lease EVs.
- EV Seed Program – Place ten used EVs plus charging stations and ride share app in mobile home parks and MUDs across SVCE's service area.
- Heat Pump Water Heaters – Increase the adoption of HPWHs by providing cash incentives and technical guidance to developers and installers. (Focus on new construction?)
- eBike Share Pilot – Collaborate with manufacturers and bike share companies on this. Locate bike sharing/charge points on corporate campuses.
- Commercial vs. Utility Scale Battery Storage Study – Commission a study to compare battery storage facilities at large commercial customers versus a utility-scale storage system.
- Direct Access Local Customer Pilot – Attract Direct Access customers to SVCE by offering comparable rates but a higher clean energy content.
- Model Ordinances – Draft template ordinances focused on electrification and decarbonization for SVCE's member communities to more easily adopt.
- Decarbonization Workshop Series – Four times per year on new technologies to improve energy efficiency, demand management, and fuel switching, etc.
- Residential Education Program – Classes on energy and energy saving.