

**Draft**

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**California Public Utilities Commission  
DISTRUBUTED ENERGY RESOURCES  
ACTION PLAN  
ALIGNING VISION AND ACTION**



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## Introduction

In 2018, the California Legislature enacted Senate Bill 100, “The 100 Percent Clean Energy Act of 2018”, which sets a 2045 goal of powering all retail electricity sold in California and state agency electricity needs with renewable and zero-carbon resources; and requires the California Energy Commission (CEC), California Public Utilities Commission (CPUC) and California Air Resources Board (CARB) to use programs under existing laws to achieve 100 percent clean electricity.

California leads the nation in the growth of distributed energy resources (DER), and this will continue due to policies such as SB 100,<sup>1</sup> new commitments to increase transportation and building electrification, continued commitment to Behind-the-Meter solar (BTM) generation and storage, and incentive programs like the Self-Generation Incentive Program (SGIP). Given these trends and the ongoing need for a coordinated strategic vision to guide DER policy, the time is ripe to prepare a new DER Action Plan (Plan 2.0).

The goal of this Distributed Energy Resources Action Plan (DER Action Plan, or DER Action Plan 2.0) is to ensure that DER policy implementation in support of SB 100 and California’s energy and climate goals is coordinated across proceedings related to grid planning, affordability, load flexibility, market integration, and customer programs. Ultimately, this DER Action Plan 2.0 seeks to align the CPUC’s vision and actions to maximize ratepayer and societal value of an anticipated high-DER future.

In 2016, the CPUC endorsed an earlier version of a DER Action Plan <sup>2</sup> covering the 2016-2020 period. The 1<sup>st</sup> Plan, DER Action Plan 1.0, served as a roadmap to coordinate activities across multiple CPUC proceedings aimed at advancing DER policy and reforming utility distribution planning, investment, and operations. The CPUC has completed the majority of the Action Elements set forth in the first Plan and now seeks to adopt a new DER Action Plan to guide the next phase of DER advancement.

### The Need for a DER Action Plan 2.0 Update for 2021-2026

Policies and trends that indicate a future with sustained high growth of DERs are:

- The CEC’s 2020 Integrated Energy Policy Report forecasts large increases in BTM solar generation (260 percent), BTM energy storage capacity (770 percent), and electric vehicle

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<sup>1</sup> See also: Executive Order B-48-18, Executive Order N-79-20, and the California Energy Commission (CEC) 2018 EV projections in the Staff Report, *California PEV Infrastructure Projections 2017-2025* (Docket 17-ALT-01, 2018-2019 Investment Plan Update for the Alternative and Renewable Fuel and Vehicle Technology Program).

<sup>2</sup> The CPUC’s Distributed Energy Resources Action Plan 1.0 from 2017 can be viewed at: <https://www.cpuc.ca.gov/about-cpuc/divisions/energy-division/der-action-plan>

demand (370 percent) from 2019 to 2030.<sup>3</sup> Among the factors driving DER growth include advancements in technology and cost declines.<sup>4</sup>

- California’s transportation electrification (TE) and climate goals are expected to result in millions of electric vehicles (EVs) and electric vehicle service equipment (EVSE) DERs by 2030. Executive Order N-79-20 sets a target for 100 percent of new cars and passenger trucks sold in California to be zero emission by 2035.
- Customer incentive programs such as SGIP continue to drive DER expansion by increasing the financial appeal of DER investment.
- Legislation aimed at reducing greenhouse gas (GHG) emissions from buildings, ongoing Commission rulemakings,<sup>5</sup> and local “reach codes”<sup>6</sup> are likely to further drive electrification in buildings.

DER Action Plan 2.0 seeks to maximize the ratepayer and societal value of millions of DERs on the grid, while ensuring affordable and equitable rates. Some of the aspirational vision elements of the first DER Action Plan are still relevant today, and more progress is needed in other areas. Some issues and challenges that were not prevalently featured in the first Plan include: accelerated transportation and building electrification, microgrids and resiliency, flexible loads and dynamic rates, and equity and affordability.

### **Purpose of DER Action Plan 2.0**

Similar to the previous Plan, DER Action Plan 2.0 will serve as a roadmap for CPUC decision-makers, staff, and stakeholders as they facilitate forward-thinking DER policy. The DER Action Plan 2.0 is intended to *coordinate* development and implementation of policy related to DERs, *not to determine outcomes* of individual proceedings. Because many of these policies are strongly linked to initiatives at the California Air Resources Board, the California Energy Commission, and the California Independent System Operator, the CPUC remains committed to close coordination with these agencies in the development and implementation of this plan.

The CPUC is committed to ensuring that DER policy is harmonized with CPUC policy directives related to safety, reliability, affordability, equity and environmental stewardship. For example, the CPUC adopted an Environmental and Social Justice (ESJ) Action Plan<sup>7</sup>, which establishes the following goals:

- Consistently integrate equity and access considerations throughout CPUC proceedings and other efforts.

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<sup>3</sup> BTM solar generated 15,800 GWh in 2019 and is forecast to generate 41,200 GWh by 2030 (mid case). BTM energy storage capacity was 340 MW in 2019 and is forecast to reach 2,600 MW by 2030 (mid case). Consumption by all types of EVs is currently about 5,000 GWh and is forecast to reach 18,500 GWh by 2030. See *Final 2020 Integrated Energy Policy Report Update Volume III California Energy Demand Forecast Update*, March 23, 2021, TN #237269.

<sup>4</sup> Refer to the Wood Mackenzie July 2020 DER outlook report previously cited. The report considers reduced DER installations due to the 2020 pandemic and forecasts the 2019 peak in DER capacity installations will not be exceeded until 2024.

<sup>5</sup> Senate Bill 1477 and AB 3232 and Building Decarbonization (R.19-01-011) and Long-Term Gas System Planning (R.20-01-007) proceedings.

<sup>6</sup> Reach codes are local building codes that seek higher energy savings and emission reductions than those required by the State’s Title 24 building standards.

<sup>7</sup> [Environmental and Social Justice Action Plan \(ca.gov\)](#)

- Increase investment in clean energy resources to benefit ESJ communities, especially to improve local air quality and public health.
- Increase climate resiliency in ESJ communities.
- Enhance outreach and public participation opportunities for ESJ communities to meaningfully participate in the CPUC’s decision-making process and benefit from CPUC programs.
- Enhance enforcement to ensure safety and consumer protection for ESJ communities.
- Promote economic and workforce development opportunities in ESJ communities.
- Improve training and staff development related to environmental and social justice issues within the CPUC’s jurisdiction.
- Monitor the CPUC’s environmental and social justice efforts to ensure that they are achieving their objectives.

Furthermore, in 2018 the CPUC adopted a comprehensive Tribal Consultation Policy<sup>8</sup> that sets forth the following goals:

- Recognize and respect Tribal sovereignty.
- Encourage and facilitate Tribal government participation in CPUC proceedings.
- Give meaningful consideration to Tribal interests in issues within the CPUC’s jurisdiction.
- Encourage and facilitate Tribal government participation in CPUC-approved utility programs.
- Protect Tribal cultural resources.
- Encourage investments by Tribal governments and Tribal members in onsite renewable energy generation, energy efficiency, low carbon transportation, and energy storage.

Tribal consultation on the DER Action Plan 2.0 will further the identified goals, particularly given the increase in public safety power shutoff events, expansion of Tribal microgrid projects, and the need for expanded rural EV infrastructure.

## Scope and Structure of DER Action Plan 2.0

The scope of DER Action Plan 2.0 includes an overall vision statement and four distinct tracks that collectively advance the CPUC’s overall vision for a high DER future. Similar to the first Plan, the four tracks in DER Action Plan 2.0 serve to highlight how a unified vision for the development of DERs can support CPUC consideration of specific actions undertaken through various proceedings and external initiatives. By highlighting the four central tracks that comprise an overall DER Action Plan, each with its own shared common vision elements, themes, and objectives, CPUC staff and stakeholders can strive to work efficiently and coherently towards a clean energy future with a large participation of DERs.

The scope of the DER Action Plan 2.0 is focused on electric sector DERs.

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<sup>8</sup> <https://www.cpuc.ca.gov/about-cpuc/divisions/news-and-public-information-office/business-and-community-outreach/tribal-office>

## Overall Vision Statement

DER deployment will play an integral role in a 100% clean energy future. The CPUC continuously explores new policies, technologies, business models, and ideas to advance distributed energy resources deployment in a manner that maximizes ratepayer and societal value and contributes to equity and affordability for all customers.

## Tracks and Related Proceedings

CPUC proceedings can be wide-ranging in scope with touchpoints that interact with many other proceedings. The tracks are logically grouped into related proceedings. We recognize that some proceedings may cut across several tracks as conceptualized in this Plan. For simplicity, where proceedings feature most prominently within the vision elements for a particular track, they are included in that “primary” track, even if they may touch upon other tracks. See Appendix A for a list of Track and Related Proceedings.

### Track 1) Load Flexibility and Rates

The Load Flexibility and Rates Track is focused on improving demand-side resource management through more effective, integrated demand response (DR) and retail rate structures that promote widespread, scalable, and flexible load strategies enabled by electrification and DER deployment opportunities. The vision and actions address grid issues associated with the growth of renewables, electrification, and DER adoption in support of California’s clean energy goals, minimize cost of electricity service, and provide fair compensation for grid services provided by customer owned DERs.

### Track 2) Grid Infrastructure

The Grid Infrastructure Track is focused on CPUC actions to guide utility infrastructure planning and operations to maximize the value of DERs interconnected to the electric grid.

### Track 3) Market Integration

The Market Integration Track is focused on the efficient integration of Behind-the-Meter (BTM) and Front-of-the-Meter (FTM) DERs into wholesale markets to support renewable integration, GHG reduction, and grid reliability. This track addresses how market integrated DERs connected to the customer, distribution, and transmission grid “domains” can be harnessed and compensated to produce multiple streams of benefits.

### Track 4) DER Customer Programs

The DER Customer Programs Track focuses on improving coordination, planning and developing consistent metrics across DER proceedings related to customer programs to maximize their contributions to GHG reductions and other state energy goals. The goal is to enable all customers to effectively manage their energy usage in a manner that ensures equitable participation and distribution of benefits, alignment with evolving rate design and load flexibility, alignment with distribution planning objectives, and alignment with integrated resource planning objectives.

## Vision and Action Elements

Each track consists of “Vision Elements” and “Action Elements.” The scope and structure of the Action Plan are necessarily limited. Because of the sheer breadth of issues touching DER and the

necessity for a concise and implementable plan, certain intermediate goals and milestones may be omitted. The Action Elements reflect ongoing and future efforts that can be undertaken to achieve the vision. In this draft plan, there may be gaps where proposed action elements are not yet included. Staff welcome suggestions from stakeholders to help fill these gaps with proposed action elements.

Note: Where Action Elements indicate “by year X,” this means by the end of that year.

## TRACK ONE: Load Flexibility and Rates

The Load Flexibility and Rates Track is focused on improving demand-side resource management through more effective, integrated demand response and retail rate structures that promote widespread, scalable, and flexible load strategies enabled by electrification and DER deployment opportunities. The vision and actions address grid issues associated with the growth of renewables, electrification, and DER adoption in support of California's clean energy goals, thereby minimizing the cost of electricity service, and providing fair compensation for grid services provided by customer owned DERs.

### Vision Element 1A

**A continuum of rate options, from the simple to complex, is available for customers, and customers are educated to make informed choices.**

#### Action Elements

1. By 2023, the large investor-owned utilities (IOUs) should design and complete focus group research to evaluate tolerance and acceptance of a range of dynamic and real time pricing (RTP) options for all customer segments. Small multijurisdictional utilities (SMJUs) and community choice aggregators (CCAs) are encouraged to participate in this effort.
2. By 2023, utilities should finalize marketing, education, and outreach (ME&O) programs that are developed in a formal load flexibility rulemaking and working group implementation process to educate customers on opt-in dynamic and RTP rates with an emphasis on lower-usage, low-income and vulnerable segments of residential and small commercial customers, pursuant to the protections set forth in PU Code Section 745.
3. By 2024, all utility customer classes have access to multiple rate options, including dynamic and RTP rate pilots that are informed by focus group research and supported by ME&O programs to match various customer preferences and engagement levels. SMJUs and CCAs are encouraged to provide the same for their customers.

### Vision Element 1B

**Available rates reflect time-variant and location-based marginal costs and include time of use, dynamic, and real time pricing options.**

#### Action Elements

1. By Fall 2021, CPUC staff should issue a white paper proposal and recommend a load flexibility rulemaking process that considers how rates can be modified to better reflect dynamic and RTP pricing options that incorporate time-variant and location-based marginal costs.
2. By Fall 2021, CPUC staff should initiate an ongoing stakeholder working group to address issues related to flexible load management and dynamic and RTP rates, including the development of IOU pilots that offer dynamic and RTP rates across all customer classes.



3. By 2024, rates that incorporate dynamic and RTP designs should be offered on an opt-in basis to all customers.

### **Vision Element 1C**

**Dynamic and real time pricing rates are designed to maximize participation by customers in disadvantaged communities, load flexibility benefits and protections.**

#### Action Elements

1. By 2022, the CPUC should conduct a workshop and/or working group sessions to address stakeholder recommendations for maximizing equity and inclusion considerations in dynamic and RTP rate designs to increase opportunities for widespread DER adoption.

### **Vision Element 1D**

**Available rates reflect cost causation and provide opportunities for fair compensation for the capacity benefits DERs provide.**

#### Action Elements

1. By 2022, the CPUC should analyze data from dynamic, RTP, and traditional rate offerings through independent evaluation studies to assess whether DERs are receiving fair compensation for their capacity benefits to the system.
2. By 2023, the CPUC should evaluate the costs and benefits of dynamic and RTP rates through pilot evaluation studies to inform rate design options for IOU implementation.
3. By 2023, the IOUs should submit proposals for opt-in and opt-out dynamic and RTP rates in certain customer classes, as permitted by law, informed by pilot evaluation studies in either a load flexibility rulemaking process or separate rate design window applications.

### **Vision Element 1E**

**Rates are designed to minimize cost-shift in either direction between customers on dynamic and real time pricing rates and other customer segments and classes.**

#### Action Elements

1. By 2023, the CPUC should assess cost-shift associated with opt-in dynamic or RTP rate pilots, at each customer class level.
2. By 2024, the CPUC should approve rate designs that incorporate principles that minimize the potential of cost-shift between customers on dynamic and RTP rates and other customers unless deemed necessary to meet specific policy goals.

## Vision Element 1F

**A menu of time-varying rate options is made available to load management technologies through a “universal access”<sup>9</sup> pricing platform and customized rates marketing, education and outreach for all customer segments.**

### Action Elements

1. By 2023, the CPUC initiates consideration of proposals to ensure that customers, technology vendors, and third-party service providers have access to pricing information for a wide range of rates through a “universal access” pricing platform.
2. By 2024, the CPUC initiates consideration of criteria to evaluate third-party subscription “pay for load shape” load management services including an assessment of how to promote participation and benefits to low-income and ESJ communities.

## Vision Element 1G

**Rates, charges, and tariffs are transparent, equitable, and aligned with load management standards.**

### Action Elements

1. Starting in 2021, CPUC and CEC staff should continuously coordinate on elements of rate design and tariffs to ensure alignment with load management standards.
2. By 2024, rates that enable flexible load management and DERs to provide system benefits should be widely available to customers.

## Vision Element 1H

**Potential strategies, including non-ratepayer-funded strategies, are considered to address affordability concerns associated with high electric rates that may impede adoption of transportation and building electrification DER technologies, especially among low-income and environmental and social justice communities.**

### Action Elements

1. By 2022, a workshop and/or series of working meetings will be convened in an appropriate proceeding to address affordability issues and barriers to participation in the transportation and building electrification DER marketplace, including alternative sources of funding for DERs, supporting technologies, and third-party load management services.

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<sup>9</sup> Universal access refers to statewide access to pricing information available via online portal, search engines, apps, in-home devices (i.e., NEST or other programmable thermostats), or other relevant technologies).

## Vision Element 1I

**Electric vehicle owners, fleet operators, and charging station managers respond to price signals that reflect the real-time and dynamic costs and benefits of charging at different times to optimize grid operations and reduce charging costs.**

### Action Elements

1. By 2022, utilities should offer EV owners and fleet operators RTP pilot rates set forth in the current General Rate Case (GRC) cycle and individual IOU EV rate applications, which incorporate location-based marginal costs to address grid optimization issues.
2. By 2024, CPUC staff should complete analysis of RTP pilots to assess the ability of EV charging loads and BTM energy storage to integrate excess supply of renewables through flexible load management response to dynamic price signals.
3. By 2024, CPUC staff should analyze the impact of RTP rates and consider whether EV owners and fleet operators should be offered such rates on an opt-out basis, as permitted by law.

## TRACK TWO: Grid Infrastructure

The Infrastructure Track is focused on CPUC actions to guide utility infrastructure planning and operations to maximize the value of DERs interconnected to the electric grid.

### Vision Element 2A

**Utility infrastructure business processes, including planning, all-source resource acquisition, and operations, are transparent, responsive to local conditions and community needs, and seamlessly integrate cost-effective distributed energy resources.**

#### Action Elements

1. Starting in 2021 (concluding in 2022), utilities implement the systems and processes needed to ensure the export of accurate, current, and comprehensive system-wide distribution system planning data to the CPUC and CEC on a semi-annual basis (at minimum).
2. By 2022, CPUC staff documents all existing Distribution Investment Deferral Framework requirements into a formal Guidelines document to be updated annually or as reforms are implemented.
3. By 2022, utilities refine their Integration Capacity Analysis (ICA) tools to provide reliable, accurate, and useful data to developers and consumers seeking to integrate distributed energy resources including generation and load.
4. By 2023, utilities establish data portals that provide Tribal and local governments with information useful for the coordinated development of resilient energy infrastructure and emergency response processes to best address community needs and reduce social burdens stemming from large-scale disruptions.
5. By 2023, CPUC staff completes a technical report on Distribution Resources Planning Data Portals improvements and conducts a stakeholder process to identify and explore potential updates and additional data to host, with the goal of increasing portal usability and usefulness for DER integration.
6. By 2024, the CPUC considers proposals to develop a formal Distribution Planning Process Guidelines document designed to enhance DER integration onto the grid, increase community engagement, and ensure state electrification initiatives are achievable while maintaining cost effectiveness. Supersede the Distribution Investment Deferral Guidelines with the new Distribution Planning Process Guidelines.
7. By 2025, utilities will update their Distribution Planning Process and Distribution Investment Deferral Framework process and filings according to the adopted Distribution Planning Process Guidelines.
8. By 2025, utilities routinely conduct distribution planning meetings with communities to coordinate planned infrastructure investments with local DER initiatives and ensure investments are resilient, serving to reduce the social burden of outages.

## Vision Element 2B

**Utility operations continuously improve interconnection performance, leading to greater transparency, speed, and cost certainty.**

### Action Elements

1. Starting late 2021, utilities pilot a notification-only interconnection process and collect data to determine practicality, safety, and associated costs. Advice Letters due in late 2023 will recommend the parameters under which this approach may be extended to other interconnection use cases.<sup>10</sup>
2. By 2022, utilities use a transparent technical review process to approve, after determining that safety and reliability requirements have been met, the use of technologies or products that can reduce the cost of DER implementation or optimize the performance of DER (e.g., lower cost relays, multi-port utility revenue meters).
3. Starting late 2022, utilities use IEEE 2030.5 servers to pilot the control of inverters for operational flexibility and telemetry.<sup>11</sup>
4. By 2022, utilities begin tracking the installation of both AC-coupled and DC-coupled vehicle-to-grid interconnections to better understand the potential capacity available from electric vehicles to meet grid needs.<sup>12</sup>
5. Starting in 2022, the CPUC revisits interconnection fees and the cost allocation for distribution network upgrades, with a goal of reaching a decision on these topics by Q4 2022.

## Vision Element 2C

**Utilities implement standards for data communications and advanced inverters that facilitate visibility, operational control, provision of grid services, and interoperability of distributed energy resources and are consistent with best practices for ensuring cybersecurity.**

### Action Elements

1. By 2022, the CPUC convenes a Smart Inverter Operationalization Working Group and, by 2023, oversees completion of a working group report, staff proposal, and stakeholder process to develop use cases, guidelines, and an implementation plan.
2. Starting in 2024, utilities update the grid modernization plans filed with their general rate cases to ensure grid investments and capabilities adequately support priority smart inverter operationalization use cases.

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<sup>10</sup> D.21-06-002, OP 1

<sup>11</sup> D.21-06-002, OP 18

<sup>12</sup> D.20-09-035, OP 43

3. By 2022, utilities identify foundational industry or national standards for communications (e.g., IEEE 2030.5-2018 - IEEE Standard for Smart Energy Profile Application Protocol, SunSpec Alliance standards) and best practices for cybersecurity to guide development of DERs that maximize the likelihood of interoperability with the evolving distribution grid.
4. By 2023, utilities conduct a gap analysis to identify any standards or best practices that need to be developed to facilitate development of DERs that will be interoperable with the evolving distribution grid.

## **Vision Element 2D**

**Utilities integrate the anticipated impacts of electrification into distribution planning to maximize public benefits and minimize costs and to optimize deployment of complimentary and supporting infrastructure and distributed energy resources.**

### Action Elements

1. By 2023, CPUC staff completes a comprehensive, data-driven electrification impacts study to estimate the scope of distribution grid buildout and identify opportunities to mitigate costs.
2. By 2025, utilities update their distribution planning processes and Distribution Investment Deferral Framework process and filings to fully account for, and report on, the scope and costs of ongoing electrification impacts.

## TRACK THREE: Market Integration

The Market Integration Track is focused on the efficient integration of BTM and FTM DERs into wholesale markets to support renewable integration, GHG reduction, and grid reliability. This track addresses how market integrated DERs connected to the customer, distribution, and transmission grid “domains” can be harnessed and compensated to produce multiple streams of benefits. The Vision Elements are grouped into four primary themes.

### Big Picture and Wholesale Market Integration of Both BTM & FTM DERs:

#### Vision Element 3A

**Resource Adequacy DER participation in wholesale markets supports efficient grid operation focused on integration of renewable energy, reduction in system cost, grid reliability, and reduction in GHG emissions.**<sup>13</sup>

#### Action Elements

1. CPUC reviews rules and tariffs to address barriers and resolve questions of whether, and if so, how exporting BTM DERs can more effectively participate in wholesale markets and qualify for Resource Adequacy (RA).
2. In consultation with CAISO, the CEC, and distribution utilities under CPUC oversight, RA rules, demand forecasting methods, and CAISO market rules are reviewed to address barriers and resolve questions of whether, and if so, how Distributed Energy Resource Aggregations and exporting BTM DERs can more effectively participate in wholesale markets and qualify for RA.
3. By 2022, CPUC staff completes an evaluation of energy storage procurement and operational performance measuring achievement of energy storage policy goals and identifying changes that can improve the future operation and procurement of energy storage.<sup>14</sup>
4. By 2022, CPUC staff issues a report with the results of its inaugural energy storage procurement study. The study scope includes a review of actual wholesale market participation, identification of potential wholesale market-related barriers, a review of policy and market design practices in other jurisdictions, and consideration of shifts in future wholesale market value streams. Study recommendations include market enhancements that could increase opportunities for energy storage resources to participate in wholesale markets in a competitive and efficient manner.
5. By 2022, the CPUC will hold two public workshops for the energy storage procurement study in which stakeholders can comment on the study’s draft findings.
6. By 2023, the CPUC should consider the findings of the energy storage procurement study in one or more relevant proceedings.

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<sup>13</sup> See D.20.06-031 and D.21-06-029.

<sup>14</sup> This study is required under CPUC Decision 13-10-040.

7. By 2026, CPUC staff completes the 2<sup>nd</sup> evaluation of energy storage procurement as required by CPUC Decision.

### **Multiple Use Applications (MUA) aka “Value Stacking”:**

#### **Vision Element 3C**

**Resource Adequacy DERs receive fair compensation when providing multiple unique services to the wholesale market, distribution grid, and end-users (“value stacking”). Rules and procedures are in place governing how DERs may participate in the wholesale market while providing distribution capacity and other services to distribution utilities, including clear prioritization in case of reliability events. Rules include appropriate safeguards to avoid cross subsidies between retail and wholesale jurisdiction.**

#### Action Elements

1. By 2023, the CPUC should determine in a proceeding, in consultation with the CAISO, the priority MUA policy issues that should be resolved to further the MUA framework.
2. By 2024, the CPUC and CAISO should identify key DER services and prioritization for those services based on reliability implications. The CPUC should identify any modifications or amendments needed to enable DER value stacking.

### **Wholesale Market Integration of Exporting BTM DERs:**

#### **Vision Element 3D**

**Rule 21 interconnection tariffs are reviewed to address barriers and resolve questions of whether, and if so how, BTM DERs can export to the wholesale grid, and the CPUC, CAISO, and CEC resolve questions of whether and how exporting DERs should receive compensation and participate in wholesale markets.**

Action Elements: not yet identified. What action elements can help achieve Vision Element 3D?

#### **Vision Element 3E**

**CAISO and distribution utilities under CPUC oversight resolve questions of whether and how Resource Adequacy Distributed Energy Resource Aggregations (DERAs) can and should participate in CAISO markets, and work to remove barriers, as appropriate, to achieve this vision.**

#### Action Elements:

1. Market rules and market access tariffs are structured to facilitate BTM DERs to efficiently participate in wholesale markets, and to fulfill all requirements of that participation, including the DERA participation model.



## **Wholesale Market Integration of FTM DERs:**

### **Vision Element 3F**

**Wholesale Distribution Tariffs (WDTs) for interconnection of DERs to the wholesale grid allow for reasonable cost recovery from DERs seeking interconnection based on cost causation principles while providing those resources with full access to wholesale markets.**

#### Action Elements

1. The CPUC participates in FERC proceedings and rulemakings related to WDTs for interconnection of DERs to the wholesale grid to represent the interests of California rate- payers and state energy and climate goals affected by FERC policy.

## TRACK FOUR: DER Customer Programs

The DER Customer Programs Track focuses on improving coordination, planning and developing consistent metrics across DER proceedings related to customer programs to maximize their contributions to GHG reductions and other state energy goals. The goal is to enable all customers to effectively manage their energy usage in a manner that ensures equitable participation and distribution of benefits, alignment with evolving rate design and load flexibility, alignment with distribution planning objectives, and alignment with integrated resource planning objectives.

### Vision Element 4A

**Coordinated DER potential studies and other resource- and technology-specific research provides the data needed for full incorporation of DERs into Integrated Resource Planning.**

#### Action Elements

1. By 2022, the CPUC should prioritize which DER technology types should be studied as candidate resources for Integrated Resource Planning. For behind-the-meter DERs, the CPUC will coordinate with the CEC to ensure appropriate alignment with the demand forecast.
2. By 2023, the CPUC should develop a plan for additional combined or individual resource studies to provide DER data needed for IRP.

### Vision Element 4B

**CPUC decisions on budgets and priorities for all ratepayer funded DER programs are informed by metrics and guidelines for cost-effectiveness, program impact, marketing, and other criteria that are consistent across programs and proceedings. Any variation occurs because of necessary differences inherent in technology.**

#### Action Elements

1. By 2022, the CPUC should consider whether and how to best conduct a programmatic review of all DER customer programs. The objective of the review is to assess, categorize, and compare DER programs and recommend programmatic changes to further align and achieve state goals and maximize ratepayer benefits.
2. By 2023, the CPUC should adopt DER cost-effectiveness protocols, similar to the existing Demand Response Cost-Effectiveness Protocols, that apply to all DER programs.
3. During 2023 and 2024, the CPUC should use the results of a programmatic review to develop other common metrics and guidelines in addition to cost-effectiveness.
4. During 2023 and 2024, the CPUC should use the results of a programmatic review to determine whether changes are needed to the portfolio of ratepayer funded DER programs to achieve state goals and maximize ratepayer benefits. Such changes could include combining complementary programs or prioritizing based on integrated resource planning results.

#### Vision Element 4C

**Understanding the impact of DER programs on low- and middle-income ratepayers, DACs, and ESJ communities becomes an inherent part of program design and management.**

##### Action Elements

1. By 2023, the CPUC should consider whether to develop guidelines and metrics, that can be used across DER programs to understand and evaluate the impact of all DER programs, whether or not they intentionally target DACs, or low- and middle-income ratepayers, to be done before program approval and as part of program evaluation.

#### Vision Element 4D

**DER activities in disadvantaged communities are coordinated across proceedings and with the ESJ Action Plan, as well as with other Commission-wide and state-wide efforts.**

##### Action Elements

1. By 2023, the CPUC should consider a framework for mutual eligibility between programs that have similar eligibility criteria and/or are seeking to expand access to similar technologies, with the goal of creating mutual eligibility or auto enrollment in all programs that focus on disadvantaged communities (DAC).
2. By 2023, the CPUC should consider issuing rules for standardized data collection for all DAC programs.
3. During 2023 and 2024, the CPUC should use the results of a programmatic review to improve program design and organization across all DER customer programs, possibly combining similar programs.

#### Vision Element 4E

**Data from smart meters and other ratepayer-funded “smart” devices is available for research purposes while retaining privacy protections and is used to improve program design and marketing.**

##### Action Elements

1. Starting in 2021, in coordination with the Grid Infrastructure track, CPUC and CEC staff will coordinate data collection, storage, and analytical efforts related to smart meter data.
2. By 2022, the CPUC should consider updating existing rules and requirements for the release of smart meter data, and best practices for use of this data to improve customer adoption of DERs.
3. By 2022, the CPUC should consider adopting similar rules and requirements for the release of data from smart devices that receive incentives from ratepayer funds.

## Vision Element 4F

**End-of-life management programs are in place to ensure the effective collection, safe transport, and environmentally responsible recycling or re-use of DERs at end of life.**

### Action Elements

1. By 2024, the CPUC should consider whether to adopt measures to ensure photovoltaic panels deployed through CPUC-overseen programs are effectively and responsibly recycled or re-used at end-of-life, considering recommendations made by the interagency working group paper *Addressing End-of-Life Management of Photovoltaic Panels*.<sup>15</sup>
2. By 2024, the CPUC should consider whether to adopt measures to ensure electric vehicle and energy storage batteries deployed through CPUC-overseen programs are effectively and responsibly recycled or re-used at end-of-life, considering recommendations made by the interagency working group paper *Addressing End-of-Life Management of Electric Vehicle and Energy Storage Batteries*.<sup>16</sup>
3. [Placeholder for potential action element regarding working with CARB to improve the end-of-life disposal of devices such as heat pumps that use refrigerants or other high global warming potential gases.]

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<sup>15</sup>[Photovoltaic Panels, Energy Storage Batteries, and Electric Vehicle Batteries \(ca.gov\)](#)

<sup>16</sup>[Photovoltaic Panels, Energy Storage Batteries, and Electric Vehicle Batteries \(ca.gov\)](#)

## Conclusion and Next Steps

Stakeholders are invited to attend a public workshop to discuss the draft DER Action Plan 2.0 on **August 26, 2021, at 9 am**. CPUC staff will also hold a Tribal consultation meeting to provide information and receive feedback from Tribal government representatives. Following the workshop and Tribal consultation meeting, written comments will be accepted and considered before DER Action Plan 2.0 is finalized and put before the CPUC for adoption.

Comments received will be most useful if these guidelines are adhered to:

1. Comments may a) suggest new vision and action elements, b) offer suggested edits to draft elements, and c) suggest which draft elements should be deleted from the plan.
2. Vision Elements - Comments on vision elements should follow a similar style as the draft plan. Vision elements should be one actionable sentence in most cases that reflect an achievable end state in the scope period (by 2026.) You may offer a brief explanation of why you have suggested a vision element, but do not assume staff will know what your proposed vision element is unless you write it in a clearly identified vision element sentence. The more succinct your comments are the more useful they are likely to be.
3. Action Elements - After reviewing the vision elements, please consider what tangible actions the CPUC, its regulated utilities, and/or other stakeholders can take to carry out specific vision elements over the next five years. Be clear which vision element your action element seeks to implement. To the extent possible, **Action Elements Should Be SMART:**
  - Specific
  - Measurable
  - Achievable
  - Relevant
  - Time-bound
4. Limit written comments to 15 pages and submit to [DERActionPlan@cpuc.ca.gov](mailto:DERActionPlan@cpuc.ca.gov) by September 10, 2021.

## Appendix A: Distributed Energy Resources Action Plan 2.0 “Track” and Related Proceedings

| Track                             | Proceeding Number             | Proceeding Name  |
|-----------------------------------|-------------------------------|--|
| <b>Load Flexibility and Rates</b> |                               |  |
|                                   | R.20-08-020                   | Net Energy Metering  |
|                                   | A.20-10-011                   | PG&E Day Ahead Hourly Real Time Pricing (DAHRTP) Rate and Pilot Application to Evaluate Customer Understanding and Supporting Technology   |
|                                   | SDG&E A.19-03-002             | General Rate Case Phase 2  |
|                                   | PG&E A.19-11-019              | General Rate Case Phase 2  |
|                                   | SCE A.20-10-012               | General Rate Case Phase 2  |
|                                   | A.17-12-011                   | Rate Design Window Applications for evaluating and implementing default residential TOU rate designs.  |
|                                   | A.19-07-006                   | SDG&E Application for Approval of Electric Vehicle High Power (EV-HP) Charging Rate Application  |
|                                   | Docket #19-OIR-1              | CEC’s Load Management Standard   |
|                                   | Pending                       | Load Flexibility Management OIR, recommended by CPUC staff   |
| <b>Grid Infrastructure</b>        |                               |  |
|                                   | R.21-06-017                   | High DER Future OIR  |
|                                   | R.17-07-007                   | Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21   |
|                                   | R.19-09-009                   | Microgrids OIR   |
|                                   |                               | General Rate Case Phase 1 proceedings for PG&E, SCE, and SDG&E   |
| <b>Market Integration</b>         |                               |  |
|                                   | R.19-11-009                   | Resource Adequacy  |
|                                   | CAISO stakeholder initiatives | Energy Storage and Distributed Energy Resources, Energy Storage Enhancements, Hybrid Resources, Transmission Planning Process, Storage as a Transmission Asset, Dispatch Enhancements (decremental market power and bid floor), Frequency Response Measures, and FERC Order 2222 |

|                              |              |  |
|------------------------------|--------------|--|
|                              | R.17-07-007  | Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21                           |
|                              | Pending      | Successor storage and/or Demand Response OIR(s), as recommended by CPUC staff                                      |
| <b>DER Customer Programs</b> |              |  |
|                              | R. 20-05-012 | Self-Generation Incentive Program  |
|                              | R.14-10-003  | Integrated Distributed Energy Resources  |
|                              | R.13-11-005  | Energy Efficiency OIR  |
|                              | R.19-01-011  | Building Decarbonization   |
|                              | R.18-12-006  | Transportation Electrification   |
|                              | Pending      | Demand Response Budget Applications due November 2021  |
|                              | Pending      | Successor to the Integrated Distributed Energy Resources (R.14-10-003) successor OIR, as recommended by CPUC staff |

## Appendix B: Definitions

**Advanced Distribution Management System:** (ADMS) See Distribution Management System.

**Advanced Metering Infrastructure:** (AMI) refers to the full energy consumption data measurement and collection system that includes advanced meters / Smart Meters at the customer site, communication networks between the customer and utility, and data collection and management systems that make the information available to the utility, customer, and authorized third party vendors.

**Behind-the-Meter:** (BTM) refers to electrical equipment and technologies that are interconnected on the customer's side of the electric meter. Customer-sited distributed energy resources (DERs) such as rooftop solar PV arrays are one of the most common examples of BTM resources.

**CAISO:** The California Independent System Operator is the electric grid operator for the transmission system, with responsibility to maintain reliability on one of the largest and most modern energy grids in the world, and operates a transparent, accessible wholesale energy market.

**CARB:** California Air Resources Board

**Community Choice Aggregator:** a governmental entity formed by one or more cities or counties to procure electricity for its residents, businesses, and municipal facilities.

**CEC:** California Energy Commission

**CPUC:** California Public Utilities Commission

**Demand Response:** (DR) refers to any change in electricity (net) demand made by the customer in response to an economic or grid signal to reduce, increase, or shift (net) demand relative to what the (net) demand level would have been in the absence of the signal. The change could be temporary or recurring in response to the signal to provide grid benefit (service).

**Demand Response Auction Mechanism:** (DRAM) a competitive solicitation mechanism run by the investor-owned utilities that enables distributed energy resource aggregators to offer their services to utilities and the state's wholesale energy markets. The commodity being traded is measured in kilowatt-months of capacity or the ability to reduce use or add energy for up to four hours at a time during the state's late afternoon and evening peaks, over the course of a month.

**Disadvantaged Communities:** DAC refers to the areas throughout California which most suffer from a combination of economic, health, and environmental burdens. These burdens include poverty, high unemployment, air and water pollution, presence of hazardous wastes as well as high incidence of asthma and heart disease. These areas represent the 25% highest scoring census tracts in State of California's CalEnviroScreen 3.0 tool.

**Distributed Energy Resources:** (DERs) include distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, time variant and dynamic rates, flexible load management, and demand response technologies. Most DERs are connected to the distribution grid behind the customer's meter (BTM), and some are connected in front of the customer's meter (FTM).



**Distributed Energy Resources Aggregations:** (DERAs) a CAISO initiative to allow small DERs—including energy storage resources—to aggregate into consolidated resources to meet the CAISO’s extant minimum capacity requirement of 0.5 MW and participate in wholesale markets.

**Distribution Management System:** [DMS, also referred to as Advanced Distribution Management System (ADMS)] a software platform that can monitor and control the distribution system efficiently and reliably.

**Electric Tariff Rule 21:** (or Rule 21) refers to the CPUC jurisdictional tariff governing the utilities’ interconnections of distributed energy resources.

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

**EV:** (Electric vehicle) See plug-in electric vehicle.

**Electric Vehicle Service Equipment: (EVSE)** the equipment that interconnects the AC electricity grid at a site to the EV. Sometimes used more broadly to mean “charging station,” whether AC or DC, but not including other behind-the-meter charging-related infrastructure.

**Flexible Load Management:** Steps taken to reduce power demand at peak load times or to shift some of it to off-peak times. This may be with reference to peak hours, peak days or peak seasons. The primary factor affecting electric peaks is air-conditioning usage, which is therefore a prime target for load management efforts, but electric vehicle charging load is rapidly emerging as a primary target of load management. Load management may be pursued by persuading consumers to modify behavior or by using equipment that regulates some electric consumption in response to time variant and dynamic prices.

**General Rate Case:** (GRC) is a proceeding used to address the costs of operating and maintaining the utility system and the allocation of those costs among customer classes. GRCs also determine the IOUs’ allowed rate of return on capital investments. For California’s three large IOUs, GRCs are parsed into two phases. Phase I of a GRC determines the total amount the utility is authorized to collect, while Phase II determines the share of the cost each customer class is responsible for and the rate schedules for each class. Each large electric utility files a GRC application every four years as of the 2020 general rate case plan decision D.20-01-002.

**FTM–** Front-of-the-meter: refers to DERs connected to the distribution and transmission grid on the utility side of the utility meter

**Integrated Resource Plan:** (IRP) is a comprehensive utility procurement plan that detail what resources are to be procured and how it will be done to comply with the State’s climate and energy policies and adequately balance safety, reliability, and cost while meeting the State’s environmental goals in SB 350 and SB 100.

**Interoperability:** The capability of two or more networks, systems, devices, applications, or components to externally exchange and readily use information securely and effectively.

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

**Multiple-Use Applications:** (MUA) refers to the multiple benefits and services that energy storage devices can provide to the grid to increase the economic value provided.

**Net Energy Metering:** (NEM) allows customers who generate their own energy ("customer-generators") to serve their energy needs directly onsite and to receive a financial credit on their electric bills for any surplus energy fed back to their utility. Customers who install small solar, wind, biogas, and fuel cell generation facilities to serve all or a portion of onsite electricity needs are eligible for the state's net metering program.

**Order Instituting Rulemaking:** (OIR) rulemaking proceeding opened by the CPUC to consider the creation or revision of rules, general orders, or guidelines in a matter affecting more than one utility or a broad sector of the industry. Comments and proposals are submitted in written form. Oral arguments or presentations are sometimes allowed.

**PEV:** (plug-in electric vehicle) is a type of zero emission vehicle (ZEV) that has no tail pipe emissions. A plug-in electric vehicle is any motor vehicle that can be recharged from an external source of electricity, such as wall sockets, and the electricity stored in the rechargeable battery packs drives or contributes to driving the car. With 100% clean energy sources, a PEV can become a ZEV.

**Program:** Mechanism that provides incentives, education, or both to ratepayers to change their behavior, purchase an energy-saving or energy-generating device, or otherwise engage in activities that help reach the state's energy or climate goals.

**Procurement:** Market-based mechanism for obtaining a DER such as an established CAISO market or a bidding process.

**Real-Time-Pricing:** (RTP) Under real time pricing tariffs, electricity consumers are charged prices that vary over short time intervals, typically hourly, and are quoted one day or less in advance to reflect contemporaneous marginal supply costs.

**Resiliency:** the ability of the grid to resist failure, reduce the magnitude and/or duration of disruptive events to the grid, and recover from disruptive events.

**Resource Adequacy:** (RA) a regulatory requirement designed to provide sufficient resources to the California Independent System Operator to ensure the safe, reliable operation of the grid in real time. RA is a planning reserve margin of available generation resources.

**Resource:** A technology that provides an energy service.

**Time-of-Use Rates:** (TOU) is a rate plan in which rates vary according to the time of day, season, and day type (weekday or weekend/holiday). Higher rates are charged during the peak demand hours and lower rates during off-peak (low) demand hours. Rates are also typically higher in summer months than in winter months. This rate structure provides price signals to energy users to shift energy use from peak hours to off-peak hours. Time-of-use pricing encourages the efficient use of the system and can reduce the overall costs for both the utility and customers.

**Vehicle-Grid Integration:** (also known as Vehicle-to-Grid Integration, V2G, or VGI) a framework for utilizing the flexible charging and discharging capabilities of plug-in electric vehicles as a grid asset.

## Appendix C: Acronyms

|                     |  |
|---------------------|--|
| A/S                 | Ancillary Service                              |
| ALJ                 | Administrative Law Judge                       |
| BTM                 | Behind the Meter                               |
| C&I                 | Commercial & Industrial                        |
| CAISO               | California Independent System Operator         |
| CARB                | California Air Resources Board                 |
| CCA                 | Community Choice Aggregator/Aggregation        |
| CEC                 | California Energy Commission                   |
| CESA                | California Energy Storage Alliance             |
| CPUC                | California Public Utilities Commission         |
| CHP                 | Combined Heat & Power                          |
| CSF                 | Competitive Solicitations Framework            |
| DAC                 | Disadvantaged Community                        |
| DER                 | Distributed Energy Resources                   |
| DER Action Plan 2.0 | Distributed Energy Resources Action Plan 2.0   |
| DERA                | Distributed Energy Resource Aggregations       |
| DERMS               | Distributed Energy Resource Management Systems |
| DERP                | Distributed Energy Resource Provider           |
| DR                  | Demand Response                                |
| DRP                 | Distributed Resources Plan                     |
| EDP                 | Emergency Dispatch Program                     |
| EE                  | Energy Efficiency                              |
| EM&V                | Evaluation, Measurement, and Verification      |
| ESA                 | Energy Savings Assistance                      |
| ESJ                 | Environmental and Social Justice               |
| EV                  | Electric Vehicle                               |

|       |   |
|-------|---|
| FTM   | Front of the Meter                                |
| GHG   | Greenhouse Gas                                    |
| GNA   | Grid Needs Assessment                             |
| GRC   | General Rate Case                                 |
| ICA   | Integration Capacity Analysis                     |
| IDER  | Integrated Distributed Energy Resources           |
| IEEE  | Institute of Electrical and Electronics Engineers |
| IOU   | Investor-Owned Utility                            |
| IRP   | Integrated Resource Plan                          |
| ME&O  | Marketing, Education, and Outreach                |
| MUA   | Multi-Use Application                             |
| NEM   | Net Energy Metering                               |
| OIR   | Order Instituting Rulemaking                      |
| PG&E  | Pacific Gas & Electric                            |
| RFO   | Request for Offers                                |
| RPS   | Renewable Portfolio Standards                     |
| RTP   | Real Time Pricing                                 |
| SCE   | Southern California Edison                        |
| SDG&E | San Diego Gas & Electric                          |
| SGIP  | Self-Generation Incentive Program                 |
| SOC   | Standard Offer Contract                           |
| TOU   | Time of Use                                       |
| TPA   | Third Party Administered                          |
| V2G   | Vehicle to Grid                                   |
| VGI   | Vehicle Grid Integration                          |

## Appendix D: Distributed Energy Resources (DER) Sourcing Mechanisms

| Sourcing Mechanism                     | Brief Description  | Applicable DER(s)                                 | Applicable Customer Segment(s)  | Proceeding(s)   |
|--|--|---|---|---|
| <b>TARIFFS</b>                         |  |   |   |   |
| NEM tariff                             | <ul style="list-style-type: none"> <li>•Customers receive a full retail rate bill credit for energy they generate and export to the grid</li> <li>•Net surplus compensation at wholesale generation rate for annual true-up</li> <li>•Variations: V-NEM, NEM-A, FC-NEM</li> </ul>  | RPS eligible resources; AES coupled w/ renewables | All sectors   | R.14-07-002   |
| FiT [e.g., BioMAT, ReMAT, CHP AB 1613] | Customer and utility enter into a long-term contract to purchase wholesale power generation from energy resources  | Varies  | Varies  | R.08-06-024<br>R.18-07-003                                  |
| <b>RATES</b>                           |  |   |   |   |
| TOU rate                               | <ul style="list-style-type: none"> <li>•Customers charged rate based on time of day that electricity is used</li> <li>•TOU period/rate design varies by IOU</li> </ul>   | All DERs  | <ul style="list-style-type: none"> <li>•Mandatory for all non-residential + NEM customers</li> <li>•Opt-in for residential</li> </ul> | R.12-06-013;<br>R.15-12-012;<br>A.15-04-012;<br>A.16-06-013 |
| CPP rate                               | Default rate for all commercial and industrial customers. Customers pay peak pricing on event days and lower pricing on other days   | DR, AES   | <ul style="list-style-type: none"> <li>•Default for all non-residential</li> <li>•PG&amp;E has opt-in for residential</li> </ul>      | GRC Phase 2;<br>RDW   |
| EV rates                               | <ul style="list-style-type: none"> <li>•Customer rates exclusively for EV charging on main meter or a separate meter. All are TOU. <ul style="list-style-type: none"> <li>• PG&amp;E Subscription Commercial EV Rate</li> <li>• SDG&amp;E High Powered EV Charging Rate</li> </ul> </li> <li>•SDG&amp;E VGI pilot examining "grid optimal" EV charging</li> <li>•SCE V2G LA AFB pilot examining optimal EV discharge for CAISO A/S frequency regulation</li> </ul> | EV  | Residential and non-residential   | R.18-12-006<br>A.19-07-006                                  |

| Sourcing Mechanism                          | Brief Description   | Applicable DER(s) | Applicable Customer Segment(s) | Proceeding(s)  |
|---|---|-------------------|--------------------------------|--|
|   | <ul style="list-style-type: none"> <li>Development of PEV Submetering Protocol to provide low cost option for customer to access EV only rates</li> </ul>   |                   |                                |  |
| Green Tariff (GT)/Shared Renewables Program | GT component allows customers to pay the cost, on top of their current rate, to obtain 50 to 100 percent of their electricity from renewable sources. Enhanced Community Renewables component allows customers to purchase a share of a community renewable project and receive a credit for the utility's avoided generation procurement.                | All renewables    | Residential                    | A.12-01-008<br>A.12-04-020<br>A.14-01-007<br>A.18-09-015 |
| DAC-GT Program                              | Provides 100% solar power and a 20% rate discount to low-income, residential customers in DACs who may be unable to install solar on their roof.  | Solar PV          | Low-income residential         | R.14-07-002  |
| Community Solar GT Program                  | Provides 100% local solar power and a 20% rate discount to residential customers in DACs or San Joaquin Valley pilot communities who may be unable to install solar on their roof. At least 50% of a project's customers must be low-income. Also provides a 20% bill discount on up to 25 percent of a project's energy output to its community sponsor. | Solar PV          | Residential                    | R.14-07-002  |

| INCENTIVE PROGRAMS  |  |         |             |                                       |
|---|--|---------|-------------|---------------------------------------|
| IOU DR programs - various rate schedules [e.g., AC Cycling, TOU-BIP, API, CBP, DBP] | <ul style="list-style-type: none"> <li>Customers agree to lower demand during called events. Incentives may be offered to offset upfront costs or as reduced rates or both</li> <li>Capacity payments + penalties for non-performance in certain programs (e.g., CBP)</li> </ul> | DR, AES | All sectors | A. 17-01-012 et al<br><br>R.13-09-011 |

| Sourcing Mechanism                                      | Brief Description  | Applicable DER(s)  | Applicable Customer Segment(s)                       | Proceeding(s)              |
|---|--|--|--|----------------------------|
| CSI   | <ul style="list-style-type: none"> <li>Incentives to customers installing eligible solar. CSI general market (solar PV and thermal) incentives are no longer available.</li> <li>Variations: CSI MASH Program, CSI SASH Program, CSI Thermal Low-Income Program</li> </ul> | Solar (PV and thermal)   | Effectively only SDG&E non-residential (wait list)   | R.12-11-005<br>R.20-05-012 |
| Solar on Multifamily Affordable Housing (SOMAH) Program | Incentives to multifamily affordable housing installing solar PV.  | Solar PV   | Low-income residential                               | R.14-07-002                |
| DAC-SASH  | Incentives to low-income DAC customers installing solar PV.  | Solar PV   | Low-income residential in DACs                       | R.14-07-002                |
| SGIP  | Incentives to customers installing eligible DERs, i.e. behind the meter energy storage and generation technologies. Excludes solar.  | AES, wind, fuel cells, CHP but generation technologies must use 100% renewable fuel as of 2020 | Residential, and non-residential                     | R.12-11-005<br>R.20-05-012 |
| Utility EE Programs                                     | <ul style="list-style-type: none"> <li>Deemed <i>midstream</i> incentives (to distributors) and <i>downstream</i> incentives (to customer) for HVAC, lighting, appliances, etc.</li> <li>Custom incentives for more complex projects</li> </ul>                            | EE   | All sectors  | R.13-11-005                |
| Third-Party Implemented IOU EE Programs                 | IOU EE portfolio implemented by third-parties, procured through competitive solicitations  | EE   | Mostly non-residential                               | R.13-11-005                |
| TPA EE Programs   | Pilots administered by third-parties, such as MCE, SoCal REN, and BayREN   | EE   | Specialize in hard-to-reach segments (MF, small C&I) | R.13-11-005                |



| Sourcing Mechanism                              | Brief Description   | Applicable DER(s) | Applicable Customer Segment(s) | Proceeding(s)  |
|---|---|-------------------|--------------------------------|--|
| ESA Program                                     | <ul style="list-style-type: none"> <li>Free installation of approved weatherization and EE measures for qualifying low-income customers</li> <li>Downstream delivery model via program contractors</li> </ul>   | EE                | Low-income residential         | R.13-11-005  |
| IOU TE programs                                 | <ul style="list-style-type: none"> <li>Pilots and programs to subsidize the installation of customer-side of the meter EV charging infrastructure</li> <li>Most programs require site-host to enroll in demand response program or adopt a load management plan.</li> <li>Ongoing efforts to develop and adopt policies to support vehicle-grid-integration (VGI).</li> </ul> | TE                | Mostly non-residential         | R.18-12-006<br>A.19-10-012                                     |
| IOU Microgrid Programs                          | <ul style="list-style-type: none"> <li>IOUs can build customer-funded microgrids at customer request under Electric Rule 2</li> <li>PG&amp;E offers technical support for microgrid development and subsidies to cover grid upgrades under CMEP</li> <li>SDG&amp;E is in various stages of developing microgrids</li> </ul>   |                   | Non-residential                | R.19-09-009, General Rate Cases, and Wildfire Mitigation Plans |
| CCA Resiliency Programs                         | <ul style="list-style-type: none"> <li>Some CCAs currently support installation of solar PV + storage for resiliency purposes.</li> </ul>   |                   | Residential                    | N/A  |
| <b>COMPETITIVELY PROCURED (RFOs)</b>            |   |                   |                                |  |
| PRP + All-Source RFOs [e.g., SCE and SDG&E LCR] | CPUC-directed RFO process to meet need specified in LTPP and IRP. Follows IOUs' new generation procurement processes. RFO overseen by PRG. Contracts submitted by application. Through these solicitations all LSE's can procure Third-party Demand Response resources  | EE, AES, DR, RPS  | Non-residential                | A.14-11.012, R.16-02-007                                       |
| SCE PRP   | SCE voluntary initiative to procure (smaller) preferred resources projects in the West L.A. local area. Follows new generation RFO process, with refinements from LCR RFO experience.   | EE, DR, RPS, AES  | Mostly non-residential         | A.15-12-013  |