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ITEM 6

Distributed Energy Resources Action Plan

Keishaa Austin, CPUC

Briefing on Proposal for Distributed Energy Resources Action Plan 2.0

DACAG Presentation | September 17, 2021, 1:00 pm

Presented by Keishaa Austin

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Energy Division



California Public
Utilities Commission

DER Action Plan 2.0 Agenda

- Defining the DER Action Plan
- DER Action Plan Background
- DER Action Plan 2.0 Scope and Structure
- Vision and Action Elements
 - Rates and Load Flexibility
 - Grid Infrastructure
 - Market Integration
 - DER Customer Programs

What is a Distributed Energy Resource?

- The Public Utilities Code 769 (a) states that “distributed resources” means distributed renewable generation resources, energy efficiency, energy storage, electric vehicles, and demand response technologies.
- 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).

DER Action Plan 2.0

- **What is the DER Action Plan?**

A roadmap for CPUC decision-makers, staff, and stakeholders to facilitate forward-thinking DER policy.

- **What does the DER Action Plan do?**

Aligns the CPUC's vision with actions that can be taken by stakeholders to ensure 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.

- **What is the goal of the DER Action Plan?**

Maximize the ratepayer and societal value of millions of DERs on the grid, while ensuring affordable and equitable rates.

- **The DER Action Plan is not meant to:**

Determine outcomes of individual proceedings.

DER Action Plan Background

- Commission endorsed DER Action Plan in November 2016
- The purpose was not to determine outcomes of individual proceedings but to:
 - **Set a long-term vision** for DERs and supporting policies
 - **Identify CPUC Actions** needed to meet that vision
 - **Establish a coordinating framework** across 15+ proceedings and CAISO stakeholder initiatives

RATES

Customer Choice

Time-varying Rates

Innovative Rates & Tariffs

Aligned with Cost Causation

Affordable to non-DER customers

Grid Infrastructure

Transparent planning and sourcing

Utility “2.0” / IOU business model

Technology-neutral sourcing

Recognize full GHG and grid services value

Streamlined interconnection

DER-enabling grid investments for ratepayer benefit

Data communications and cybersecurity

Market Integration

Robust DER participation in wholesale markets

Multiple revenue streams

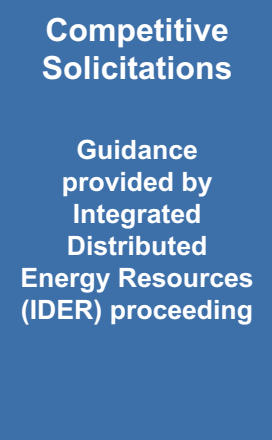
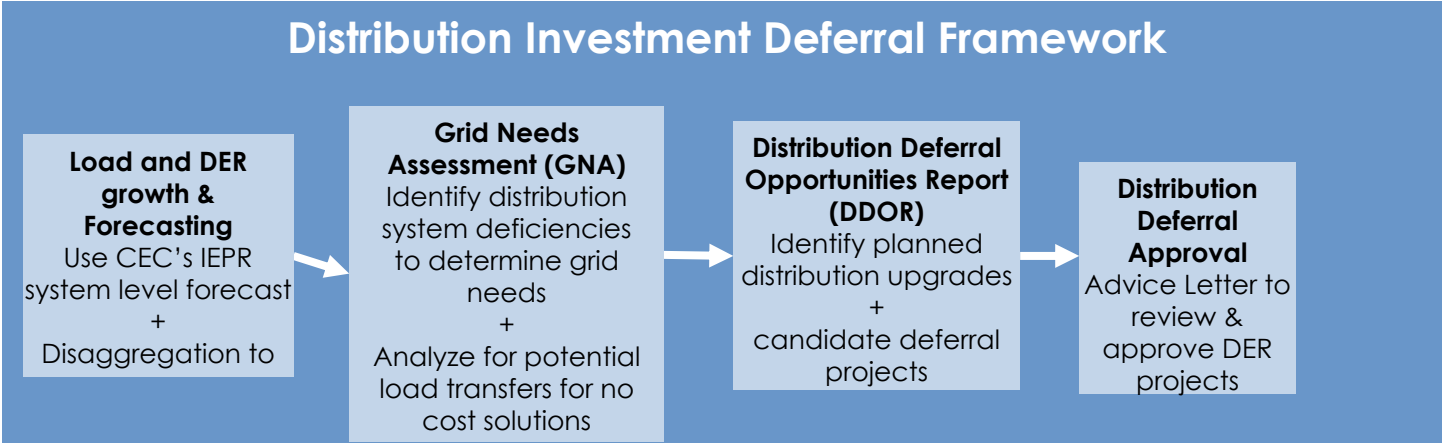
Market and interconnection rules supportive of BTM DERs

Predictable EV behavior in grid operations

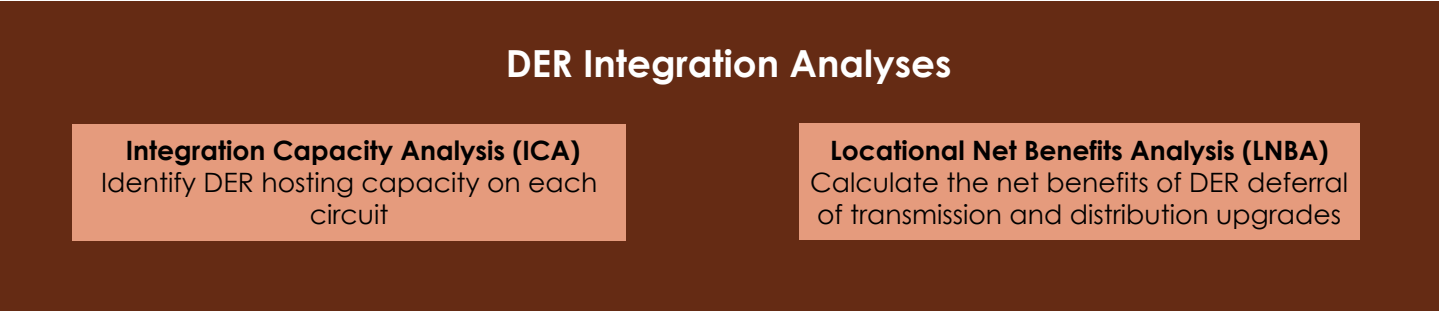
Non-discriminatory market rules for EVs

Example of DER Action Items Fulfilled: DRP has transformed Grid Planning to utilize DERs

1. Reformed Utility Distribution Planning to use DERs instead of Wires, if and when possible



2. Provided 3rd party DER providers with information about where DERs can go best



3. Reoriented Grid Investments described in GRCs to integrate DERs



DER ACTION PLAN 2.0

Scope and Structure

TRACK ONE

Load Flexibility & Rates

9 Vision Elements
20 Action Elements



TRACK TWO

Grid Infrastructure

4 Vision Elements
19 Action Elements



TRACK THREE

Market Integration

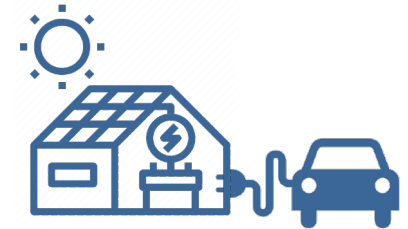
5 Vision Elements
11 Action Elements
1 Undefined Action Element



TRACK FOUR

DER Customer Programs

6 Vision Elements
16 Action Elements



DER Action Plan 2.0

Overall Vision Element & Stakeholder Engagement

- DER deployment is integral to achieving 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.
- The CPUC is committed to ensuring that DER policy is harmonized with CPUC policy directives related to safety, reliability, affordability, equity and environmental stewardship including aligning the DER Action Plan with the Environmental and Social Justice Action Plan.

DER ACTION PLAN 2.0

Proceeding and Initiatives List

TRACK ONE	TRACK TWO	TRACK THREE	TRACK FOUR
<p>Load Flexibility & Rates</p> <ul style="list-style-type: none"> • Net Energy Metering • PG&E Day Ahead Hourly Real Time Pricing (DAHRTP) Rate and Pilot Application to Evaluate Customer Understanding and Supporting Technology • SDG&E, PG&E and SCE GRC Phase 2 • Rate Design Applications for evaluating and implementing default residential TOU rate designs. • SDG&E Application for Approval of Electric Vehicle High Power (EV-HP) Charging Rate Application • Load Flexibility Management OIR, recommended by CPUC staff. • CEC’s Load Management Standard 	<p>Grid Infrastructure</p> <ul style="list-style-type: none"> • High DER Future OIR • Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21 • Microgrids OIR • PG&E, SCE and SDG&E General Rate Case Phase 1 	<p>Market Integration</p> <ul style="list-style-type: none"> • Resource Adequacy • Successor Storage and/or Demand Response OIR(s), as recommended by CPUC staff • Rule 21 • FERC Order 2222 and Other FERC Proceedings • Potential CAISO Initiatives: <ul style="list-style-type: none"> • 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). 	<p>DER Customer Programs</p> <ul style="list-style-type: none"> • Self-Generation Incentive Program • Energy Efficiency • Building Decarbonization • Integrated Distributed Energy Resources • Transportation Electrification • Demand Response • Net Energy Metering • Energy Savings Assistance Program

DER Action Plan 2.0

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 (DR) and retail rate structures that promote widespread, scalable, and flexible load strategies enabled by electrification and DER deployment opportunities.

The vision and action elements 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.

DER Action Plan 2.0 Vision Elements

Track One: Load Flexibility and Rates

<u>Vision 1A</u>	<u>Vision 1B</u>	<u>Vision 1C</u>	<u>Vision 1D</u>	<u>Vision 1E</u>	<u>Vision 1F</u>	<u>Vision 1G</u>	<u>Vision 1H</u>	<u>Vision 1I</u>
A continuum of rate options, from the simple to complex, is available for customers, and customers are educated to make informed choices.	Available rates reflect time-variant and location-based marginal costs and include time of use, dynamic, and real time pricing options.	Dynamic and real time pricing rates are designed to maximize participation by customers in disadvantaged communities, load flexibility benefits and protections.	Available rates reflect cost causation and provide opportunities for fair compensation for the capacity benefits DERs provide.	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.	A menu of time-varying rate options is made available to load management technologies through a “universal access” pricing platform and customized rates marketing, education and outreach for all customer segments.	Rates, charges, and tariffs are transparent, equitable, and aligned with load management standards.	Potential strategies, including non-ratpayer-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.	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.
3 Action Elements	3 Action Elements	1 Action Element	3 Action Elements	2 Action Elements	2 Action Elements	2 Action Elements	1 Action Element	3 Action Elements

DER Action Plan 2.0

Track One: Action Elements

Vision Element 1D

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

Action Element 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.

Action Element 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.

Action Element 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.

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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”.

DER Action Plan 2.0

Track Two: Grid Infrastructure

<u>Vision Element 2A</u>	<u>Vision Element 2B</u>	<u>Vision Element 2C</u>	<u>Vision Element 2D</u>
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.	Utility operations continuously improve interconnection performance, leading to greater transparency, speed, and cost certainty.	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.	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.
8 Action Elements	5 Action Elements	4 Action Elements	2 Action Elements

DER Action Plan 2.0

Track Two: Action Elements

Vision Element 2D: Electrification

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.

High DERs

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.

High DERs

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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.

Primary Themes:

1. Big Picture and Wholesale Market Integration of Both BTM & FTM DERs
2. Multiple Use Applications (MUA) aka “Value Stacking”
3. Wholesale Market Integration of Exporting BTM DERs
4. Wholesale Market Integration of FTM DERs

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Track Three: Market Integration

<u>Vision Element 3A</u>	<u>Vision Element 3B</u>	<u>Vision Element 3C</u>	<u>Vision Element 3D</u>	<u>Vision Element 3E</u>
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.	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.	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.	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.	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.
7 Action Elements	2 Action Elements	None Defined	1 Action Element	1 Action Element
Theme #1	Theme #2	Theme # 3	Theme # 3	Theme #4

DER Action Plan 2.0

Track Three: Market Integration Action Elements

Wholesale Market Integration of Exporting BTM DERs	
Vision 3C: 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.	Potential Proceeding / Initiative
Action Element 1. To be defined.	TBD

Questions to address for Vision Element 3C and 3D:

- What are the overlapping jurisdictional issues?
- Can/should individual BTM market facing resources go through Rule 21 or Wholesale Distribution Tariff for interconnection?
- What are the primary barriers to interconnection of exporting DERs?

DER Action Plan 2.0

Track Four: DER Customer Programs

The DER Customer Programs track is focused 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 of the DER Customer Programs track 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.

DER Action Plan 2.0

Track Four: DER Customer Programs

<u>Vision Element 4A</u>	<u>Vision Element 4B</u>	<u>Vision Element 4C</u>	<u>Vision Element 4D</u>	<u>Vision Element 4E</u>	<u>Vision Element 4F</u>
Coordinated DER potential studies and other resource- and technology-specific research provides the data needed for full incorporation of DERs into Integrated Resource Planning.	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.	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.	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.	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.	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.

DER Action Plan 2.0

Track Four: DER Customer Programs

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 Element 4C

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

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Track Four: DER Customer Programs

Vision Element 4D

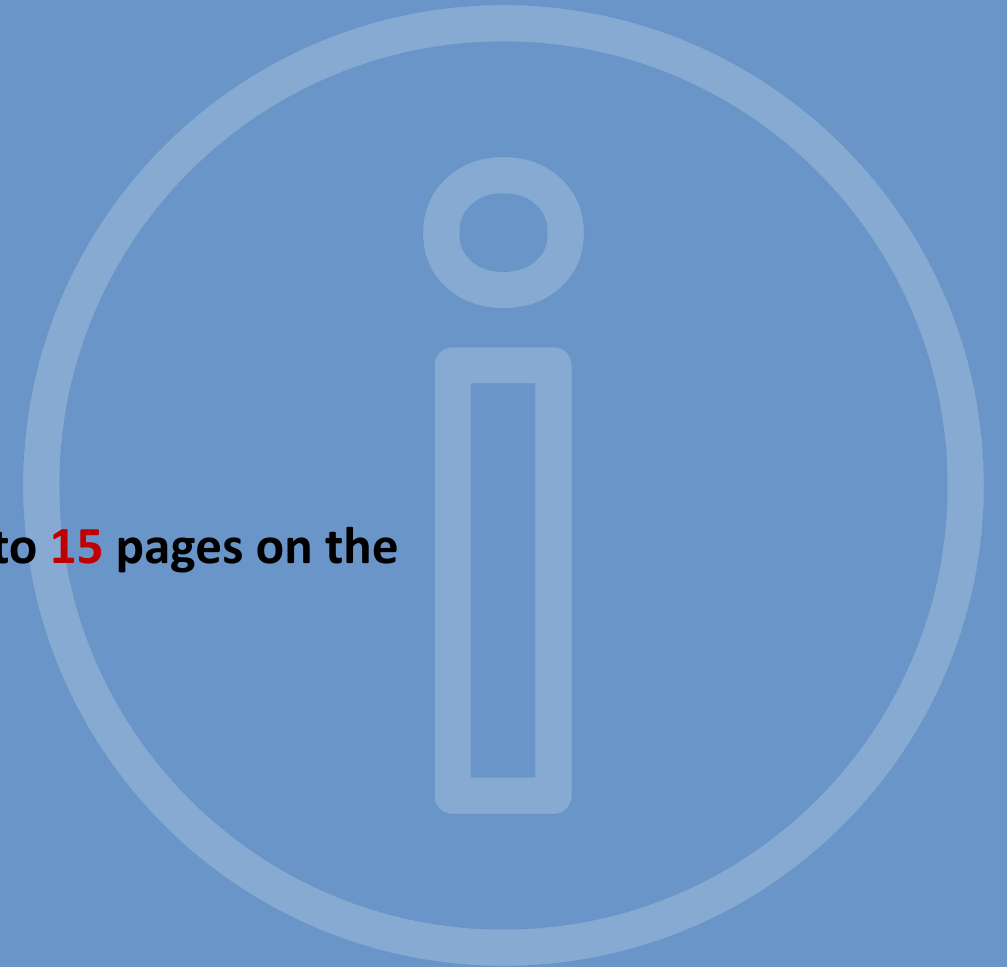
DER activities in disadvantaged communities are coordinated across proceedings and with the ESJ Action Plan, as well as with other Commission-wide and state-wide efforts.

Action Elements 4D

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.
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.

For more information:

- **DIDF, Data Portals, DER Action Plan:**
Keishaa.Austin@cpuc.ca.gov
- Stakeholders are invited to submit written comments up to **15** pages on the draft DER Action Plan 2.0 by **October 8, 2021** to
DERActionPlan@cpuc.ca.gov



THANK YOU

DER Action Plan 2.0

BACK UP SLIDES

DER Action Plan 2.0

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 (DR) and retail rate structures that promote widespread, scalable, and flexible load strategies enabled by electrification and DER deployment opportunities.

The vision and action elements 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.

DER Action Plan 2.0 Vision Elements

Track One: Load Flexibility and Rates

<u>Vision 1A</u>	<u>Vision 1B</u>	<u>Vision 1C</u>	<u>Vision 1D</u>	<u>Vision 1E</u>	<u>Vision 1F</u>	<u>Vision 1G</u>	<u>Vision 1H</u>	<u>Vision 1I</u>
A continuum of rate options, from the simple to complex, is available for customers, and customers are educated to make informed choices.	Available rates reflect time-variant and location-based marginal costs and include time of use, dynamic, and real time pricing options.	Dynamic and real time pricing rates are designed to maximize participation by customers in disadvantaged communities, load flexibility benefits and protections.	Available rates reflect cost causation and provide opportunities for fair compensation for the capacity benefits DERs provide.	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.	A menu of time-varying rate options is made available to load management technologies through a “universal access” pricing platform and customized rates marketing, education and outreach for all customer segments.	Rates, charges, and tariffs are transparent, equitable, and aligned with load management standards.	Potential strategies, including non-ratpayer-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.	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.
3 Action Elements	3 Action Elements	1 Action Element	3 Action Elements	2 Action Elements	2 Action Elements	2 Action Elements	1 Action Element	3 Action Elements

DER Action Plan 2.0

Track One: Action Elements

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 Element 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.

Action Element 2: 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.

Action Element 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.

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Track One: Action Elements

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 Element 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.

Action Element 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.

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

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Track One: Action Elements

Vision Element 1C

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

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.

DER Action Plan 2.0

Track One: Action Elements

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 Element 1: By 2023, the CPUC should assess cost-shift associated with opt-in dynamic or RTP rate pilots, at each customer class level.

Action Element 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.

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Track One: Action Elements

Vision Element 1F

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

Action Element 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.

Action Element 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.

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Track One: Action Elements

Vision Element 1G

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

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.

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Track One: Action Elements

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 Item 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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Track One: Action Elements.

Vision Element 1I

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 Element 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.

Action Element 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.

Action Element 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.

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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”.

DER Action Plan 2.0

Track Two: Grid Infrastructure.

<u>Vision Element 2A</u>	<u>Vision Element 2B</u>	<u>Vision Element 2C</u>	<u>Vision Element 2D</u>
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.	Utility operations continuously improve interconnection performance, leading to greater transparency, speed, and cost certainty.	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.	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.
8 Action Elements	5 Action Elements	4 Action Elements	2 Action Elements

DER Action Plan 2.0

Track Two: Action Elements

Vision Element 2A: Integration and Local Responsiveness

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).

High DERs

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.

High DERs

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.

High DERs

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.

Microgrids &
High DERs

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.

High DERs

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.

High DERs

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.

High DERs

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.

High DERs &
Microgrids

DER Action Plan 2.0

Track Two: Action Elements

Vision Element 2B: Interconnection

- 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.
- 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.
- 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.
- 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 Q42022.

Interconnection

Microgrids

Interconnection

Interconnection

Interconnection

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Track Two: Action Elements

Vision Element 2C: Interoperability and Cybersecurity

- 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.
- 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.

High DER
General Rate Cases

DER Action Plan 2.0

Track Two: Action Elements

Vision Element 2D: Electrification

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.

High DERs

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.

High DERs

DER Action Plan 2.0

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.

Primary Themes:

1. Big Picture and Wholesale Market Integration of Both BTM & FTM DERs
2. Multiple Use Applications (MUA) aka “Value Stacking”
3. Wholesale Market Integration of Exporting BTM DERs
4. Wholesale Market Integration of FTM DERs

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Track Three: Market Integration

<u>Vision Element 3A</u>	<u>Vision Element 3B</u>	<u>Vision Element 3C</u>	<u>Vision Element 3D</u>	<u>Vision Element 3E</u>
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.	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.	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.	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.	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.
7 Action Elements	2 Action Elements	None Defined	1 Action Element	1 Action Element
Theme #1	Theme #2	Theme # 3	Theme # 3	Theme #4

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Track Three: Market Integration Action Elements

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.	Potential Proceeding / Initiative
Action Element 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).	Resource Adequacy
Action Element 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.	Resource Adequacy, IEPR, CAISO
Action Element 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.	Storage Evaluation Study & Future Storage/DR OIR
Action Element 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.	Storage Evaluation Study & Future Storage/DR OIR
Action Element 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.	Storage Evaluation Study
Action Element 6: By 2023, the CPUC should consider the findings of the energy storage procurement study in one or more relevant proceedings.	TBD
Action Element 7: By 2026, CPUC staff completes the 2nd evaluation of energy storage procurement as required by CPUC Decision.	TBD

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Multiple Use Applications (MUA) aka “Value Stacking”	
Vision 3B: 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	Potential Proceeding / Initiative
Action Element 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.	Future Storage/DR OIR, CAISO Initiatives and TBD
Action Element 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.	FutureStorage/DR OIR, CAISO initiatives and TBD

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Wholesale Market Integration of Exporting BTM DERs	
Vision 3C: 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.	Potential Proceeding / Initiative
Action Element 1. To be defined.	TBD

Questions to address for Vision Element 3C and 3D:

- What are the overlapping jurisdictional issues?
- Can/should individual BTM market facing resources go through Rule 21 or Wholesale Distribution Tariff for interconnection?
- What are the primary barriers to interconnection of exporting DERs?

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Track Three: Market Integration Action Elements

Wholesale Market Integration of Exporting BTM DERs	
Vision 3D: 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.	Potential Proceeding / Initiative
Action Element 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.	Resource Adequacy, Rule 21, and CAISO

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Track Three: Market Integration Action Elements

Wholesale Market Integration of FTM DERs	
Vision Element 3E: 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.	Potential Proceeding / Initiative
Action Element 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.	FERC Proceedings

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Track Four: DER Customer Programs

The DER Customer Programs track is focused 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 of the DER Customer Programs track 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.

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Track Four: DER Customer Programs

<u>Vision Element 4A</u>	<u>Vision Element 4B</u>	<u>Vision Element 4C</u>	<u>Vision Element 4D</u>	<u>Vision Element 4E</u>	<u>Vision Element 4F</u>
Coordinated DER potential studies and other resource- and technology-specific research provides the data needed for full incorporation of DERs into Integrated Resource Planning.	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.	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.	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.	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.	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.

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Track Four: DER Customer Programs

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 4 A

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.

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Track Four: DER Customer Programs

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 4D

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.
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.

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Track Four: DER Customer Programs

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 4B

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.

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Track Four: DER Customer Programs.

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 Element 4C

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

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Track Four: DER Customer 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 4E

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.

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Track Four: DER Customer Programs.

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 4F

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*.
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*.
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.]