

# CPUC Fast Trip, Unplanned Outages, and Distribution Reliability Workshop

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# SCE Service Area & High Fire Risk Areas



**50,000 SQ. MI.**  
of SCE service area  
across southern,  
central and coastal  
California

**14,000 SQ. MI.**  
of high fire risk  
areas



**52,000 MI.**  
of SCE overhead  
distribution and  
transmission lines

**14,000 MI.**  
in high fire risk areas

## Counties with high fire risk area served by SCE

Fresno  
Inyo  
Kern  
Los Angeles  
Mono  
Orange  
Riverside  
San Bernardino  
Santa Barbara  
Tulare  
Ventura



**5M**  
customer accounts  
or 15M residents in  
SCE's service area

**1.3M**  
customer accounts  
or 3.9M residents  
served by circuits in  
high fire risk areas

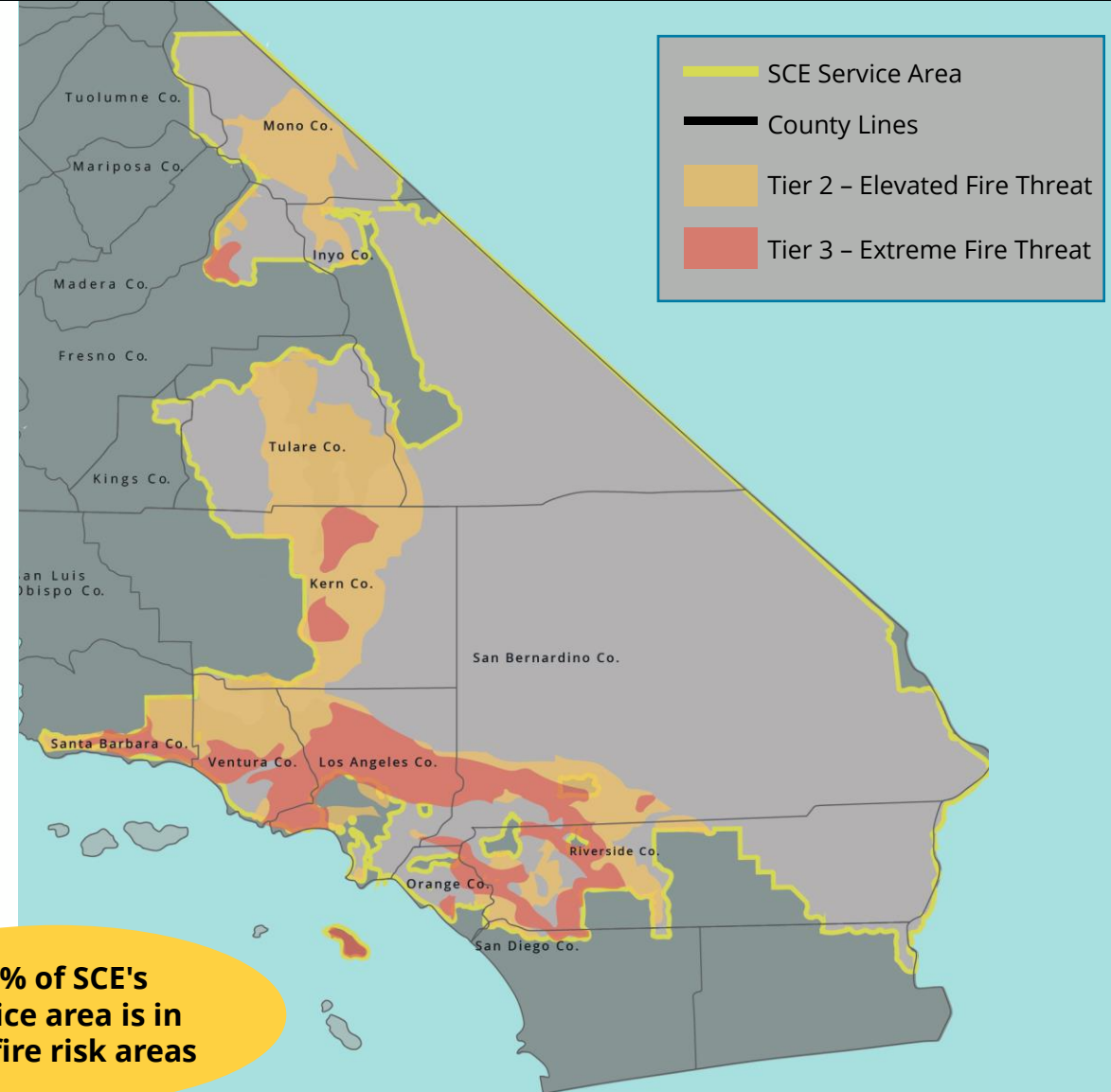


**1.4M**  
power poles






**300,000**  
in high fire risk areas

## Counties with no or limited high fire risk areas served by SCE

Imperial  
Kings  
Madera  
Tuolumne

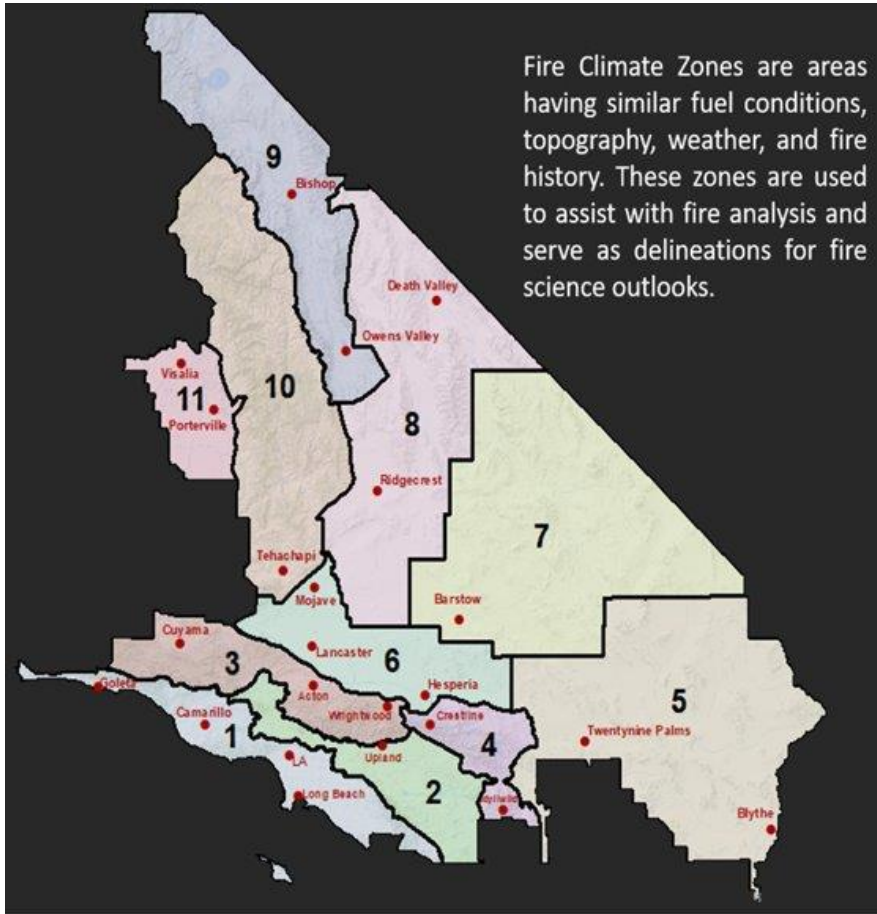


# Majority of outages are maintenance outages with advance notice provided customers to minimize impacts

	Outage Type	Percent of Outage <sup>1</sup>
	<p><b>Maintenance Outages:</b> A scheduled outage that occurs when SCE turns the power off for equipment upgrades. Customers are notified a minimum of three days in advance if they will be affected.</p>	<p>~<b>61.5%</b></p>
	<p><b>Repair Outages:</b> An outage caused by unexpected circumstances, such as a car crashing into a pole resulting in a power outage. <b>Note:</b> Outages that occur when fast curve is active are classified as repair outages</p>	<p>~<b>25%</b></p>
	<p><b>Emergency Operational Outage:</b> An outage taken to make emergency repairs before the condition deteriorates further resulting in a repair outage.</p>	<p>~<b>13%</b></p>
	<p><b>Public Safety Power Shutoff (PSPS):</b> A preventive outage called during extreme and potentially dangerous weather conditions to mitigate effects of catastrophic wildfire. These last-resort shutoffs are temporary measures to keep customer and communities safe.</p>	<p>&lt;<b>0.5%</b></p>
	<p><b>Public Agency Outages:</b> Outages requested by a public/government agency (i.e., firefighters) where SCE's facilities could pose a danger to emergency first responders.</p>	<p>&lt;<b>0.1%</b></p>

<sup>1</sup> 2022 outage counts

# Fast curve settings are enabled based on weather conditions to increase public safety & reduce fire risk associated with SCE facilities



SCE enables fast curve settings for equipped devices on impacted circuits and circuit sections that traverse high fire risk areas (HFRA) in the event of any of the following:

- **Red Flag Warning** declared by National Weather Service
- **Fire Weather Threat** declared by SCE Weather Services
  - Circuit conditions forecasted for Fire Potential Index (FPI) greater than or equal to 11 and wind speeds greater than or equal to 31 mph sustained and/or 46 mph gust
- **Fire Climate Zone Threat** declared by SCE Weather Services
  - Seasonal approach based on zone-specific historical occurrence of fuel-driven fires
- **Thunderstorm Threat** declared by SCE Weather Services
  - Weather models predicting 30% or higher chance of dry lightning occurring over HFRA area

# PSPS and fast curve settings are two wildfire mitigation tools that are complimentary and should not be viewed as alternatives

		PSPS	Fast Curve
Criteria	When We Deploy	<b>Fire Weather Threat</b> - Fire Potential Index (FPI) and windspeed thresholds are exceeded <sup>1</sup>	Red Flag Warning Days Fire Climate Zone Threat <b>Fire Weather Threat</b> Thunderstorm Threat
	Risk Reduction	PSPS could have reduced the number of structures damaged by past fires by more than 90% <sup>2</sup>	~54% reduction in ignition-to-fault ratio of circuits with fast curve enabled compared to circuits without fast curve enabled <sup>3</sup>
	Action	Turn off power proactively to prevent faults from occurring as a tool of last resort	Increase relay sensitivity when a fault is detected
	Outage Duration	Depends on period of concern, patrols and required repairs	Depends on patrols and required patrols

<sup>1</sup> Fire Potential Index (FPI) threshold for PSPS is 12 or increased to 13 if complete isolatable circuit segment is covered conductor. Windspeed threshold is 31 mph (sustained)/46 mph (gust) or increased to 40/58 mph if complete isolatable circuit segment is covered conductor. Windspeeds may be modified based upon specific event/grid criteria.

<sup>2</sup> Measured as structures damaged or destroyed in wildfires greater than 1,000 acres associated with SCE's infrastructure during 2015–2020, using red flag warning days as a proxy for PSPS conditions. Please note, however, that a red flag warning, alone, would not necessarily result in a decision to implement a PSPS

<sup>3</sup> Data uses 2022 ignition and fault data from June to October and compares circuits in HFRA with and without fast curve

# Number of outages on circuits with fast curve in 2022 has not increased compared to historical averages

Circuit Breaker and Remote-controlled Automatic Recloser (RAR) Outages on Fast Curve Circuits During Fire Climate Zone Threat Conditions (June – October)			
Category		2015-2017 (Avg) <sup>1</sup>	2022
<b>Fast Curve Circuits</b>		-	956
<b>All Outages</b>	Outages	781	757
	Outages Per Circuit	0.82	0.79
	Customers Interrupted Per Outage	1,265	1,540
	Customer Minutes of Interruption Per Outage	~60k	~145k
	Duration Per Outage (Hours)	7.4	9.5
<b>Sustained Outages Only</b>	Outages	428	714
	Outages Per Circuit	0.45	0.75
	Customers Interrupted Per Outage	1,552	1,551
	Customer Minutes of Interruption Per Outage	~110k	~155k
	CAIDI (Hours)	~2	~2
	Duration Per Outage (Hours)	13.4	10.1

<sup>1</sup>Data analyzed circuit performance for 2015-2017, using the 956 circuits with fast curve installed in 2022

# Once an outage occurs SCE works to minimize impacts to customers and is working to improve restoration times

SCE is reviewing key analytics that allow us to understand the causes of long restoration times and will help inform process changes and future infrastructure needs

Repair/Emergency Outage Restoration	PSPS De-energization Restoration	Public Agency Outage Restoration
<ul style="list-style-type: none"><li>• Dispatch crews to troubleshoot the circuit and identify outage cause</li><li>• Identify repairs needed or upgrade equipment (repair, maintenance, emergency operational)</li><li>• Isolate location needing repairs and sectionalize circuit to restore power to as many customers as possible</li><li>• Perform repairs and restore power to remaining customers</li></ul>	<ul style="list-style-type: none"><li>• Perform post event circuit patrol</li><li>• Identify if repairs are needed</li><li>• Isolate location needing repairs and sectionalize circuit to re-energize as many customers as possible</li><li>• Perform repairs and restore power to remaining customers</li></ul> <p><b>Note:</b> PSPS outages are preventative and start and end times are based upon weather conditions</p>	<ul style="list-style-type: none"><li>• Restore power after the public/government deems area safe</li></ul>



# SCE actively works to address reliability issues, regardless if the cause is known or related to fast curve settings

## Circuit Improvement Programs

SCE uses reliability metrics at the system level to address circuits with lower reliability<sup>1</sup>

## Circuit Performance Reviews

SCE field engineers regularly perform root cause reviews of circuit performance incorporating local knowledge to find solutions

## Other Infrastructure Replacement Programs

Other SCE infrastructure replacement programs may also aid in reducing recurring issues related to outages, such as covered conductor deployment

## Training to Identify Outage Causes

SCE aims to reduce the number of outages with an unknown cause by providing training to identify outage causes. However, there are cases where an outage will occur, a patrol is performed, and a cause cannot be determined

- There has not been an increase of outages with unknown causes on circuits where fast curve settings are installed
- Strategies for reducing outages with unknown and known causes will continue to be evaluated

<sup>1</sup> Excludes PSPS outages

# SCE has engaged local and tribal governments to alert them of fast curve protection settings and works with them during large events

## Local & Tribal Government Engagement

### Outage Preparedness

- In Oct. 2022, sent letters to over 500 local/tribal government stakeholders<sup>1</sup> in HFRA with an update on SCE's wildfire mitigation activities, including fast curve settings and PSPS, as well as informational materials about outage preparedness and customer programs
- Provide regular public safety newsletters, which includes outage preparedness information, to local and tribal governments and community-based organizations<sup>2</sup>

### Significant Outages

- Engage with local and tribal governments to provide awareness and address concerns
- Local and tribal governments can sign up to receive notifications for outages that meet certain criteria (i.e., impacting more than 150 customers and duration is greater than 90 minutes)
- Government facilities and other critical infrastructure and facilities can also sign up for the [Public Safety Partner Portal](#)



## Outage & Wildfire Mitigation Information Available Online

- Learn about different outage types and outage tips and sign up for outage alerts at [sce.com/outages](https://sce.com/outages)
- Look up outage details at [sce.com/outagemap](https://sce.com/outagemap)
- Learn more about customer resources and programs at [sce.com/customerresources](https://sce.com/customerresources)
- Learn about SCE's wildfire mitigation and PSPS efforts on [sce.com/wildfire](https://sce.com/wildfire).
- Learn more about fast curve settings via "faster grid protection settings" [fact sheet](#)

<sup>1</sup> Including public safety partners, county and tribal administrators, city managers, public works directors

<sup>2</sup> In 2022, 6 public safety newsletters were sent to ~2,000 government and 1,300 community stakeholders

# SCE has a variety of programs to help reduce the impact of outages to its customers



## CUSTOMER RESOURCE CENTERS & COMMUNITY CREW VEHICLES

- Services offered: Information, charging of mobile and portable medical devices, PSPS outage alert enrollment support, access to water, light snacks, ice and ice vouchers, restrooms, and small insulated bags to keep medication cool
- Translations services for over 120 languages including American Sign Language (ASL)



## CUSTOMER PROGRAMS

- Partnered with 211 to help customers with Access and Functional Needs (AFN) develop a resiliency plan and enroll in eligible assistance programs
- 211 provides specialized referrals for customers with AFN experiencing PSPS, and services include connecting customers to shelf-stable food, hot meal delivery, transportation and/or temporary shelter



## CUSTOMER RESILIENCY EQUIPMENT

- Critical Care Backup Battery program and the In-Event Battery Loan pilot provide eligible customers with a portable backup battery to power a medical device during a PSPS event
- Rebates on portable batteries and generators for customers residing in high fire risk areas on [marketplace.sce.com](https://marketplace.sce.com)

# SCE Customer Programs and Resources

Program/Resource	Details	Eligibility Criteria	Customer Participation Cost	Active PSPS	Outage in HFRA	Outage in Non-HFRA
<b>Community Resource Centers (CRC) and Community Crew Vehicles (CCV)</b>	64 CRCs and 8 CCVs, activated ~180 times and visited by ~ <b>14,000 customers</b> with <b>satisfaction of 8.8</b> out of 10	HFRA, PSPS In-Event	No cost to customers	x	By exception <sup>1</sup> only	By exception <sup>1</sup> only
<b>Critical Care Backup Batteries</b>	SCE provides back-up batteries at no cost to Medical Baseline customers who reside in High Fire Risk Areas. <b>11,400+ batteries have been deployed</b> as of 3/7/23	HFRA, Medical Baseline	No cost to customers	x	x	
<b>In-Event Battery Loan Pilot</b>	Will provide customers a battery as loan (delivery and pickup included) for customers reliant on medical devices or assistive technology; <i>2023 launch</i>	HFRA, PSPS In-Event	No cost to customers	x		
<b>Hotel Discount Program</b>	Negotiated discounts with <b>123 hotels</b> for customers to utilize during extended outages, 50% of which are located in HFRA	Any extended outages, including PSPS	Varies by hotel	x	x	x
<b>211 Services</b>	Emergency preparedness, in-event support (hotel, food, transportation)	HFRA, PSPS In-Event Only	No cost to customers	x	By exception <sup>1</sup> only	By exception <sup>1</sup> only
<b>Disability Disaster Access &amp; Resources (DDAR) Program</b>	Emergency preparedness, in-event support (backup battery, hotel, food, transportation) administered by CFILC; <i>2023 launch</i>	HFRA, PSPS In-Event	No cost to customers	x		
<b>Partnerships with Community Based Organizations (CBOs)</b>	SCE provides information and resources to <b>1,600+ CBOs</b>	Independent Living Center client/referral	No cost to customers	x	x	x
<b>Self-Generation Incentive Program (SGIP)</b>	Assist customers in the purchase of permanent battery storage	Open to all customers	Varies	x	x	x
<b>Backup battery and portable generator rebate programs</b>	Rebates to assist customers in the purchase of backup batteries or portable generators, <b>over 7,000 rebates</b> have been issued to date.	HFRA	Varies	x	x	
<b>Other AFN Resiliency Support</b>	<ul style="list-style-type: none"> <li>Contracts with food banks and paratransit agencies</li> <li>AFN resiliency resources provided to CBOs, and at CRC/CCV</li> <li>PSPS notifications will be translated into American Sign Language <i>in 2023</i></li> </ul>	HFRA, PSPS In-Event Only	No cost to customers	x		

<sup>1</sup> Resources will be deployed on an exception basis, pending approval from the on-duty Incident Commander during an Incident Management Team (IMT) activation for significant non-PSPS outage events