

# 2020-22 WILDFIRE MITIGATION PLAN

**Southern California Edison's 2020-22 Wildfire Mitigation Plan builds on the significant progress made in 2019 to help prevent wildfires and protect the safety of our customers and our communities. Our plan will advance the maturity of our wildfire mitigation capabilities in a number of dimensions beyond what we've done in the past. The 2020 plan expands existing programs and includes deployment and testing of new technologies, including machine learning and sophisticated risk assessments that are helping us plan and prioritize our work. We also are focused on minimizing the impact of Public Safety Power Shutoffs (PSPS) and helping our customers and communities with emergency preparedness. Our efforts will complement the state's enhanced wildfire efforts, which include additional funding for forest management and firefighting resources.**

## ENHANCED OVERHEAD INSPECTIONS

In just five months in 2019, SCE completed inspections on all overhead transmission, distribution and generating equipment located in high fire risk areas. In 2020 and beyond, SCE plans to do annual inspections of the highest risk structures as identified by our advanced risk model. These inspections go well beyond the current regulatory requirement of five-year inspection cycles for distribution and three-year cycles for transmission equipment and are in addition to Operation Santa Ana, where SCE and state and county fire agencies perform joint patrols to ensure adequate tree and brush clearances.

We will use ground and aerial inspections to obtain a 360-degree view of our structures and equipment. For the aerial inspections, SCE is deploying state-of-the-art, helicopter-mounted infrared technology which picks up heat signatures that indicate damaged equipment.

In addition, SCE is investing in machine learning and artificial intelligence capabilities to review the images captured during inspections and automatically identify equipment that may need maintenance, repair or replacement.



## GRID DESIGN AND SYSTEM HARDENING

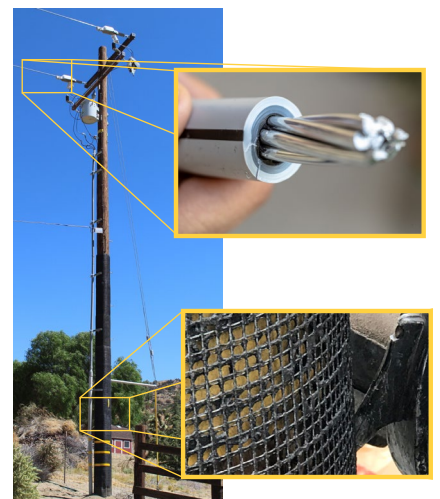
### Covered Conductor, Fire-Resistant Poles and Sectionalizing Devices

Since 2018, SCE has replaced more than 500 circuit miles of industry-standard bare wire with covered conductor. SCE will accelerate its covered conductor program in 2020, replacing at least 700 circuit miles. Many of the ignitions associated with utility infrastructure are caused by objects that contact power lines or by conductor-to-conductor contact. Covered conductor has proven to be an effective prevention measure. SCE is targeting the highest risk areas for near-term deployment, as well as areas where covered conductor can reduce the need for PSPS.

In 2019, SCE did extensive testing of wooden poles wrapped with a fire-resistant barrier and determined that this technology is a cost-effective solution that can protect poles against a passing wildfire. SCE plans to install at least 8,190 poles this year with a mix of composite poles and wooden poles with fire-resistant wrap. This resiliency measure will reduce the risk of damaged poles blocking roadways during an emergency while enabling us to more quickly restore power to customers afterward.

SCE also will be installing fast-acting fuses at more than 3,000 locations. These fuses reduce electrical current when there's a wire-down event and segment circuits to minimize the number of customers impacted during a PSPS. Other sectionalizing devices will also be installed.

In addition to reducing the risk of wildfires, these grid hardening measures improve reliability by reducing the number and scope of interruptions caused by electrical system contact with foreign objects.



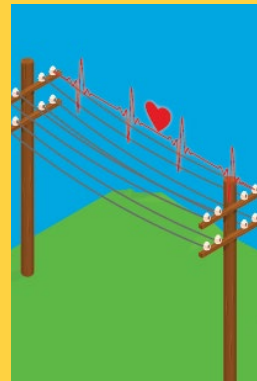
# SPOTLIGHT ON EMERGING TECHNOLOGIES

As we move forward with implementing our 2020 Wildfire Mitigation Plan and deploying the latest proven technologies, we are constantly looking for new approaches from other utilities, academia and industry that can make our communities safer. Here are three examples of emerging technologies that will be field tested during pilot programs in 2020.



## TRANSMISSION OPEN PHASE DETECTION

A transmission system with a broken line (called an "open phase" condition) has a unique "current and voltage signature." SCE worked with manufacturers to develop a solution that reads this unique signature to identify an open phase condition and de-energizes the line before it hits the ground and potentially ignites a fire. SCE validated the technology in a power system simulator in 2019 and plans to pilot the technology on six transmission/ sub-transmission lines in high fire risk area this year.



## DISTRIBUTED FAULT ANTICIPATION (DFA)

DFA functions like a heart monitor for the distribution system. DFA reads the current and voltage signature and uses this information to predict potential equipment failures. This enables SCE to make needed repairs before the equipment fails, reducing the risk of a fire and increasing reliability. SCE completed installation of an initial 60 DFAs on Feb. 1 and will perform an in-depth performance evaluation to determine the effectiveness of DFA technology.



## EARLY FAULT DETECTION (EFD)

SCE is evaluating Early Fault Detection technology to leverage radio frequency emitted from equipment to detect emerging issues. This type of technology provides complementary benefits to the DFA systems and could work in concert with the DFA to detect potential system anomalies and more accurately pinpoint the source of the potential defects and needed repairs.

## SITUATIONAL AWARENESS

### Weather Stations and High-Definition Cameras

The size of SCE's service territory in high fire risk areas and its diverse terrain require a dense network of weather stations to monitor location-specific, real-time conditions. SCE plans to expand deployment of these stations in 2020, in part due to realizing even greater benefits than had been expected. For example, the data they provide is allowing for more targeted de-energizations during PSPS events. At least 375 stations will be installed in 2020, moving toward a goal of two weather stations per circuit in high fire risk areas, or up to 2,600 weather stations by 2024. By the end of this year, the company will have one of the country's largest, densest networks of weather stations.

The installation of fire-spotting, high-definition cameras was completed in 2019. The 161 cameras installed to date provide visual coverage of more than 90% of high fire risk areas, reaching a practical saturation point given the terrain and topography in these areas. Additional cameras will not provide meaningful benefits.



## VEGETATION MANAGEMENT

Vegetation management programs will largely continue 2019 efforts. SCE inspects approximately 1.1 million trees annually, including 500,000+ trees in high fire risk areas. The company prunes nearly 750,000 trees per year. In high fire risk areas, SCE will trim or remove trees to maintain a minimum 12-foot clearance from power lines (at the time of trim) to prevent vegetation from coming into contact with electrical equipment and potentially sparking a fire.

Tall trees up to 200 feet from high-voltage power lines will be assessed to determine if they could fall into or have vegetation like palm fronds that could blow into power lines. Trees that overhang wires, have weak branches or are dead, diseased or dying may be removed if they show a risk of falling into the lines. We also will expand the effort to clear brush surrounding poles.



## PUBLIC SAFETY POWER SHUTOFFS

Although the frequency and scope of PSPS events are expected to lessen as more of our Wildfire Mitigation Plan mitigations are deployed, PSPS will have to remain available as a tool to mitigate wildfire risk during severe weather and high fire potential index events. Following PSPS events last year, we found equipment damage and tree branches contacting lines that could have ignited fires, illustrating the importance of these safety shutoffs.

SCE has been able to limit the number of customers impacted by PSPS by using sectionalizing devices to de-energize segments instead of entire circuits and by relying on real-time weather information, as well as other factors, to make PSPS decisions. Approximately 2% of customers in our service area were affected during the company's most severe event last year.

To further reduce impacts, we are rapidly developing circuit-specific plans that could include replacing certain segments of bare conductor with covered conductor (included in our covered conductor program), targeting undergrounding projects, installing spacers to reduce line slapping (or conductor-to-conductor contact) or adding switching devices to improve flexibility for circuit reconfigurations to keep the power on.

SCE also is pursuing a Resiliency Microgrid Pilot to examine the potential of microgrids to help keep the lights on during a PSPS. Microgrids are self-contained electric grids that can provide around-the-clock energy for a limited time and can operate while tied to the larger electric system and separated (or "islanded") from it. The pilot is considering six communities with at least one emergency service provider, as well as low-income and critical care customers who rely on electric-powered medical devices. The goal is to have a microgrid that can be functional by September when the higher fire risk period historically begins.

Our 2020 Wildfire Mitigation Plan also includes resiliency solutions such as additional Community Resource Centers and assistance with battery backup for income-qualified Medical Baseline customers to reduce the impact of PSPS events. In addition, we will be increasing outreach to vulnerable populations and implementing additional measures to provide resiliency.

In 2019, we expanded PSPS notification options, including an opportunity to receive notifications based on zip code and mobile number to assist non-account holders, such as tenants and relatives. We upgraded our website to provide information to customers and communities impacted by PSPS in multiple languages, including Spanish, Chinese, Korean, Vietnamese and Tagalog. In 2020, we will be using a new channel, Google Public Alerts, to notify everyone with a cellphone in a PSPS-impacted area without requiring signing up on SCE.com.

