DOCKETED	
Docket Number:	18-IEPR-05
Project Title:	Climate Adaptation and Resiliency
TN #:	224355
Document Title:	Fire Safety and Resilience in the Electricity System
Description:	Presentation by David Erne at the August 2 Joint Agency Workshop on Climate Adaptation and Resiliency
Filer:	Denise Costa
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	8/1/2018 7:18:02 PM
Docketed Date:	8/2/2018

Fire Safety and Resilience in the Electricity System

Summary of July 25, 2018 Staff Workshop

David Erne
August 2, 2018
California Energy Commission

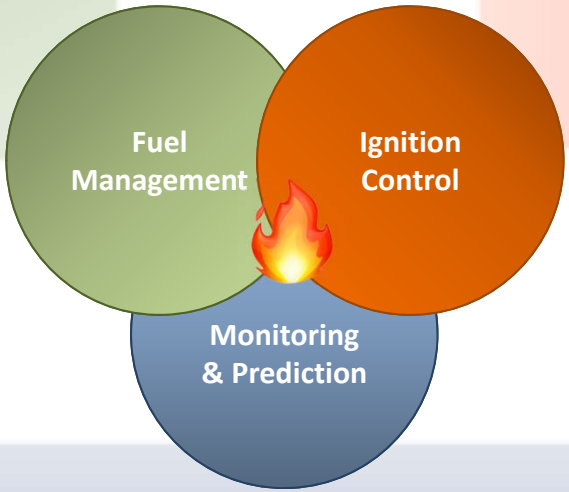
Panel Discussion

- **Arthur O'Donnell**, Risk Assessment Supervisor, Safety and Enforcement Division, California Public Utilities Commission
- **Tom Bialek,** Chief Engineer, San Diego Gas and Electric
- **Paul Hauser,** General Manager, Trinity Power
- **Brian Chen,** Principal Manager, Grid Resiliency Program Management Office, Southern California Edison
- **Joe Herr**, Grid Integration & Innovation, Pacific Gas and Electric
- **Nicole Meyer-Morse**, Science and Technology Advisor, California Governor's Office of Emergency Services

Approaches to Wildfire Risk Prevention

- Clearance Requirements
- Vegetation Management
- Right Tree Right Place
- Aerial Patrols
- LiDAR Surveys

- Infrastructure Hardening
- Protective Device Settings
- Preventative De-energization
- Fault Detection & Analysis
- Pole Loading
- Maintenance & Inspection



- Weather Prediction
- Condition Monitoring & Analysis
- Situational Awareness
- Storm Preparation & Response
- Emergency Response

Source Concept: CPUC

Fuel Management

- Vegetation accounts for a quarter of reported ignition incidents
  - Arborists are not able to predict which trees will fail under wind conditions exceeding 55 miles per hour, but even tree failure with winds of 25 miles per hour is hard to predict

- Suggested research areas:
  - Identify more effective and accurate evaluation methods to assess the condition of existing trees
  - Leverage technology (e.g., augmented visualization) to to be able to recognize hazardous conditions that could lead to wildfires
  - Pair LIDAR and other imaging/sensing with data analytics (approaching real-time analysis) to pin-point vegetation that poses the highest risks
  - Develop best approaches to reducing right-of-way fire risks

Ignition Control

- The second leading cause of fire ignitions is failure of electric lines, accounting for roughly 20% of all reported ignitions

- Suggested research areas:
  - Develop better information on conductor failure causation and prediction (e.g., from broken/falling vegetation, flying debris, wire slap, age and degradation, toppling poles)
  - Leverage voltage and phasing data to inform decisions on which circuits to de-energize in the event of an emergency
  - Develop a falling conductor detection scheme (e.g., detect a falling conductor and de-energize the circuit before it falls)
  - Improve methods for assessing the post-installation condition of overhead lines (beyond visual observation)
  - Evaluate the effectiveness of infrastructure hardening methods and fire safety of utility equipment
  - Investigate low energy automatic reclosers
  - Demonstrate advanced power poles with sensors for fire, wind, downed wire, and real-time loading
  - Decentralize the control of safety equipment (e.g., automatic response) for faster system response to events

Monitoring & Prediction

- Weather data and modeling are essential tools for emergency preparedness and response

- Suggested research areas:
  - Develop best strategies for determining locations for deploying sensors, high definition cameras, etc.
  - Leverage multiple data sources, combined with machine learning, artificial intelligence, etc.
    - Equipment sensors to detect the condition of conductors, transformers
    - Telemetry to send that data back
    - Ground based, aerial, or satellite multi-spectral imaging or sensors to view topology or condition of vegetation relative to grid assets
  - Overcome challenges of communication infrastructure, particularly in remote areas
  - Develop strategies for multiple risk response, such as earthquakes and floods, in addition to fires

Resilience

- Although the focus was on wildfire prevention, there was substantial discussion of resilience research
  - Community solutions
    - How do we create fire resilient homes? What are the essential services? How do you restore only essential services immediately? What do consumers need (critical load circuits in the home)?
    - How to work with communities and utilities on resilient zones that would remain energized in the event of utility de-energization
  - Microgrids
    - Apply at a substation in high fire risk area, to apply additional storage to keep customers energized during extreme events
  - Mobile energy
    - Design distribution circuits that could provide multiple connection points for mobile energy storage systems
    - Deployment of a mobile battery that could be moved around to power command centers in the event of an emergency

Recommendations & Next Steps

- Recommendations
  - Develop a wildfire prevention and resilience research working group
    - Refine and coordinate research areas
    - Include a broad set of stakeholders including community representatives

- Next Steps
  - Develop working group and structure public scoping meetings
  - Identify near-term research priorities for the Energy Commission
  - Develop one or more GFOs to initiate research
  - Leverage research from other entities

Questions

David Erne

David.Erne@energy.ca.gov

(916) 327-1399