Reduction of Drought Risks to Electric Facilities

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Summary of SED Actions To Identify and Reduce Drought Risks to Electric Facilities

1. GO 95, Rule 18: Established Extreme and Very High Fire Threat Zones
2. Drought Resolution
3. Drought Impacts Survey
4. Participation in Subcommittee of Governor's Drought Task Force

Direct Impacts of Drought on Power Lines

1. **Vegetation:** More chances for dry vegetation to ignite, causing fires and damaging power lines and poles supporting electric and communication facilities
2. **Current leakage ("Tracking"):**
   A. Dust: Increases in the amount of dust in the air can contaminate insulators and cause fault conditions.
   B. Smoke: Smoke can create an electrical path away from transmission lines, decreasing power efficiency from coronas and possibly causing fault conditions from arcing.
3. **Trees**: Damaged trees and branches may cause power lines to fail and fall to ground
4. **Structural damage**: Damage to underground structures may also damage equipment contained therein

Indirect Impacts of Drought on Power Lines

High temperature usually accompanies drought conditions. Such a combination can:

1. Lower power-carrying capability of system elements such as transmission lines, transformers, circuit breakers, etc.
2. Accelerate deterioration of dielectric materials, operating mechanisms, supporting structures, and insulating liquids used in power apparatus
3. Induce greater overall wear and tear impacts on apparatus which leads to increased vulnerability to faults and cascading failures
4. Shorten life of batteries that are crucial in supporting UPS and emergency response systems

Extreme and Very High Fire Threat Zones

CDR

- California Department of Forestry and Fire Protection identified areas most vulnerable to fires.
- Fire and Resource Assessment Program Map

CPUC

- GO 95 recognizes those defined areas.
- SED inspects associated facilities, identifies violations.

Utilities

- Utilities must consider defined areas when prioritizing corrective actions.

CPUC Power Line Requirements Enforced by SED

1. GO 95, Rule 18: Extreme and Very High Fire Threat Zones
   - IOUs and CIPs should take appropriate action to remedy Safety Hazards
   - Extreme and Very High Fire Threat Zones apply to Southern California
   - Consideration should be given to fire threat level (such as “High Fire Threat”) when prioritizing repair work orders for GO 95 nonconformances
2. GO 95, Rule 35: Vegetation Management
   - 18 inches minimum clearance from trees
   - Remove rotten and diseased trees that may fall into a span (droughts have serious effects on trees)

3. GO 166: Standards for Operation, Reliability, and Safety During Emergencies and Disasters
   - Governor Brown declared a State of Emergency due to the drought
   - Standards are to ensure that electric utilities are prepared for emergencies and disasters in order to minimize damage and inconvenience to the public, due to:
     - electric system failures
     - major outages
     - hazards posed by damage to electric distribution facilities

4. Drought Resolution on June 12, 2014 Agenda
   - Increasing vegetation inspections
   - Removing hazardous, dead and sick trees and other vegetation near the IOUs' electric power lines and poles
   - Sharing resources with the California Department of Forestry and Fire Protection (CalFire) to staff lookouts adjacent to the IOU's property
   - Clearing access roads under power lines for improved fire truck access
   - IOUs should examine and create public-private partnerships during the state of emergency

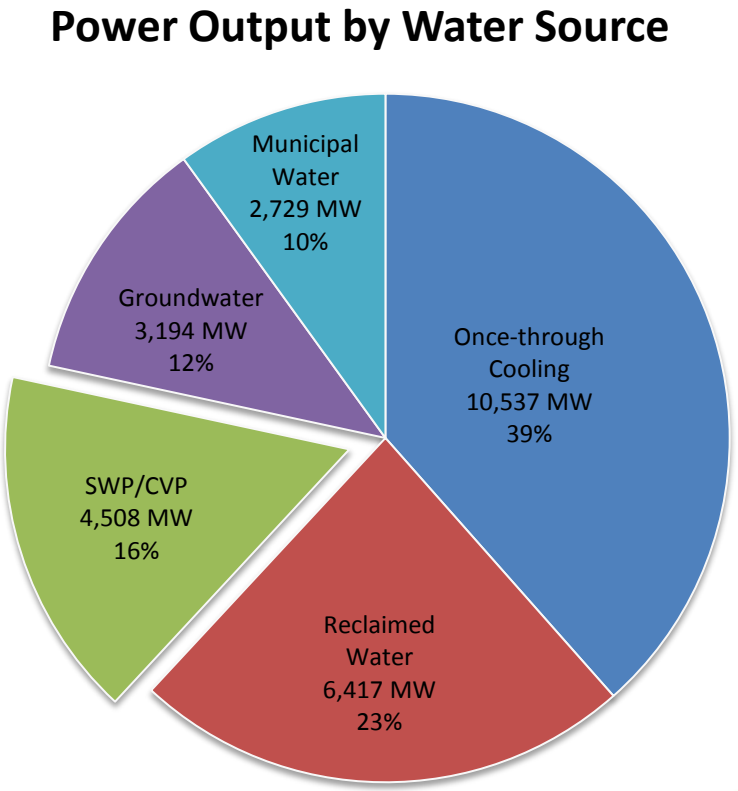
Impacts of Drought on Generation Facilities

- Cooling water needs
- Solar power plant water needs and efficiency impacts

SED Drought Survey of Electric Generators

March/April 2014 - SED surveyed over 50 large CA plants to determine short and long term drought effects.

- **Most impact:** Plants that rely on water from the State Water and Central Valley Projects = 16% power output.
- **Least impact:** Plants that utilize the ocean and reclaimed (reusable) water = 62%.



2014-2015 Drought Impacts on Generation.

- **2014: Most plants will see no impacts due to**:
  - Reclaimed and ocean water.
  - Banked water reserves.
  - Wells that tap into underground water supply.
- **2015: If drought continues**:
  - Backup water supply depleted.
  - Plants unable to cool and condense steam back to liquid.
  - Less power production commensurate with reduced water supply.

Governor's Drought Task Force Subcommittee

Participants:

- Governor's Office
- CPUC Energy and Safety Divisions
- Energy Commission
- State Water Board
- Office of Emergency Services
- California Independent System Operator

SED role

- Monitor and identify water conditions at power plants.
- Report on status changes and potential solutions.