EPIC PICG Wildfire Mitigation Workstream

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Grid Technology Innovation

Proactive Storm Analytics- EPICII

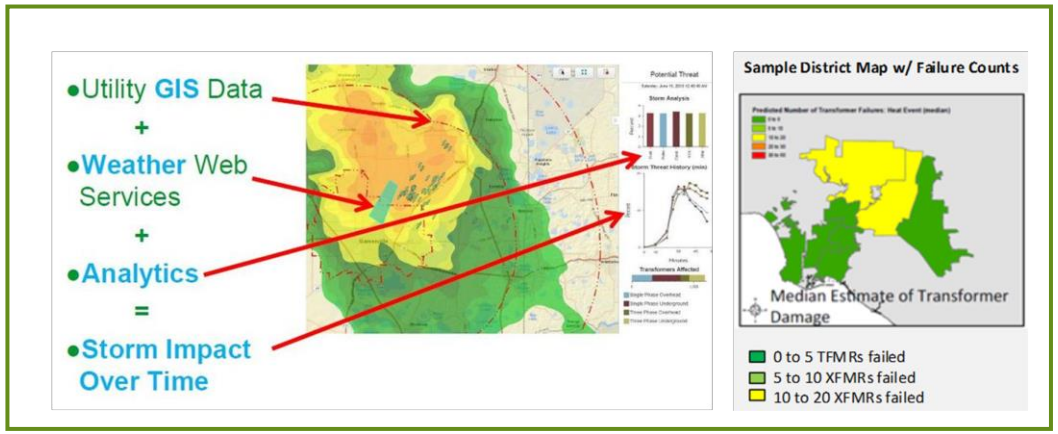
Proactive Storm Analysis

The Proactive Storm Impact Analysis Demonstration Project was designed to improve operational efficiency and reduce the costs associated with storm-related outages through enhanced data analytics and forecasting capabilities.

Overview

- Integrated visual display of key assets on GIS electrical network with heat map visualization to show likelihood of damage or predicted outage occurrence based on forecasted weather
- Outage reconstruction and reporting models utilizing voltage data and meter exceptions/event data. Application should be able to recreate outages, restoration timing, and customer counts and associate with a visual display.
- Potentially replace the email report that T&M PMA current
- sends out to report weekend resource needs

Proactive Storm Analytics



Inputs: Historical/Simulated Data

WEATHER DATA

OUTAGE DATA
Assets, Incidents, SmartMeters

RESOURCE UTILIZATION

Outputs: Predictive Analytics

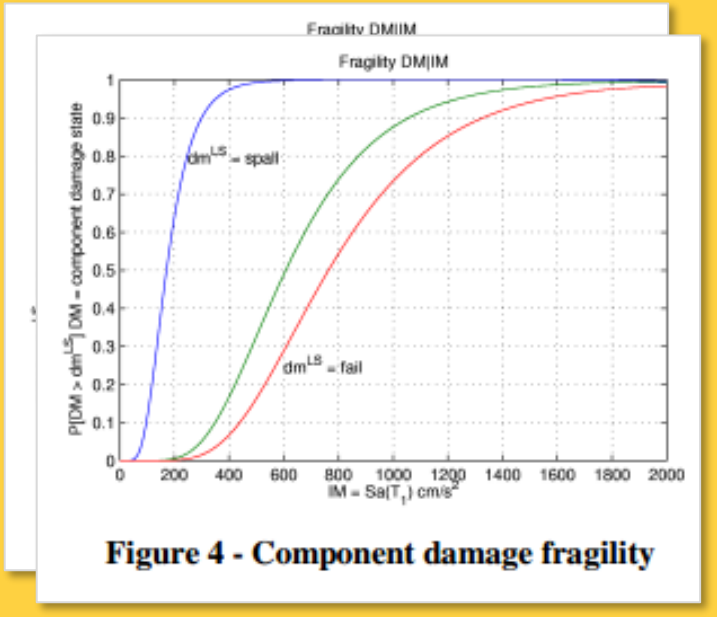


Figure 4 - Component damage fragility

RESOURCE/DAMAGE MODEL

- 3-5 day estimated impact based on historical data
- Resource needed for restoration
- Storm intensity (mild, moderate, severe, catastrophic)
- DC&M district or city level granularity
- Runs continuously to adjust to impending event

FRAGLITY CURVE

- Probabilistic treatment of damage or loss of asset
- Weather related
- Example: Based on weather, area, and overall asset health, likelihood of loss/damage

Datasets

WORK ORDERS/ACTIVITY
File contains work type, crew mix and timesheet

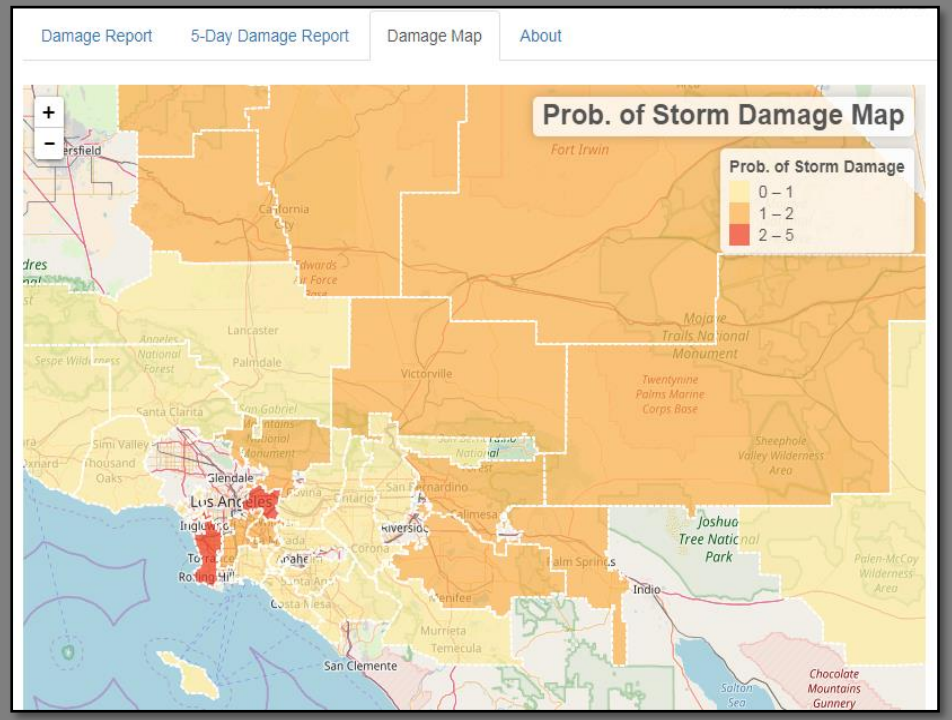
PERSONNEL
- Position
- Time in position

WEATHER
- Temperature
- Rain
- Wind

STORM DATA
- Asset Damage
- Storm Data

ASSET DATA
- Elevation
- Slope
- Equipment
- Proximity to Sub-Station

AI + ML



Damage Map

Outcomes

MULTI-STAGE MODEL
- Storm Classifier
- Equipment Damage Model

DAMAGE MODELS
- Service Transformer
- Distribution Pole
- Underground Cable
- Overhead Conductor

RESOURCE MODELS
- Trouble man Hours
- Field Crew Hours

SITUATIONAL AWARENESS
- Shorter and more accurate response times
- Enhanced resource utilization efficiency
- Increased corporate-wide situational awareness of potential outage conditions related to inclement weather

Comprehensive Hazard Assessment Tool

SOUTHERN CALIFORNIA EDISON®

Comprehensive Hazard Assessment Tool

The purpose of this project is to demonstrate a tool that employs geospatial analysis and risk assessment techniques to identify high hazard areas, asset vulnerabilities, and the impact of mitigations to enhance the overall resilience of the Grid.

Overview

- Streamline hazard event planning and analysis to improve mitigation processes
- Combine several hazard assessments into a single tool to assess hazard risk
- Integrate diverse hazard data used in risk assessment for improved hazard modeling
- Demonstrate an all-hazards risk assessment toolkit that provides geospatial analysis
- Model long term hazard mitigation and test event-based situational awareness

Problem Being Solved

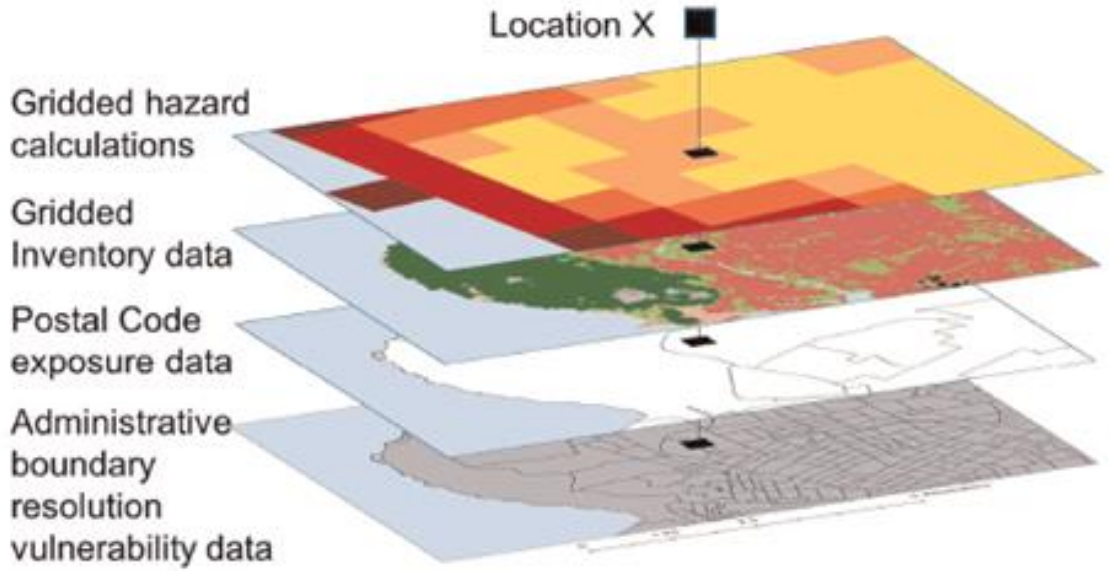
- No consolidated hazard data model or analysis tools
- A comprehensive view of hazard impacts is difficult
- Impact of climate change is needed for RAMP filing
- Utility planners lack comprehensive hazard modelling

Opportunity Statement

A comprehensive hazards assessment tool enhances our ability to prepare, recover and respond to natural hazard events including climate change. A tool with such capabilities can improve our understanding of exposure and physical vulnerabilities to normal and extreme events thereby allowing SCE to identify resilience measures and to understand the known risks and consequences.

The primary objectives of the project are to:

- Investigate the ability to improve upon and incorporate internal tools used for hazard assessment.
- Investigate the potential of taking several open source or commercially available risk assessment and geospatial analysis tools and adding functionality to develop an all hazards risk assessment tool for a utility.
- Develop a capability in the tool to merge asset information, failure probabilities where known, and hazards to determine high or low case scenarios to determine the overall hazard risk of an asset or area.
- Combine several features of hazard assessment into a single tool rather than disparate processes to illicit future maturity in assessing risk.
- Develop capabilities to inform hazard mitigation in the long term but also to provide early situational awareness in the case of an acute event such as an earthquake or heavy storm.



Expected Key Outcomes

- Demonstrate comprehensive natural hazard risk assessment capabilities to identify the costs and benefits of options to avoid or mitigate the impacts of natural hazards
- Implementation of a natural hazard risk data model integrated with internal sources such as GCM and EAP.
- Demonstrate Natural Hazard Models for:
  - Seismic Events
  - Wind/Snow / Ice Storm Events
  - Sea Level Rise / Flooding Events
  - Extreme Precipitation Events
  - Intense Temperature Events
- Demonstrate long-term mitigation planning & short-term emergency response use cases