Liberty Utilities (CalPeco Electric) LLC
933 Eloise Avenue
South Lake Tahoe, CA 96150
Tel: 800-782-2506
Fax: 530-544-4811

June 11, 2024

DATA REQUEST RESPONSE

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

Data Request No.: Energy Safety DR RMWG_2024-001
Subject Matter: Risk Model Working Group
Originator: Andie Biggs
Due Date: June 11, 2024

REQUEST NO. 1:

Regarding: visual depiction of risk models

Please provide a visual depiction of various models used by utilities and how such models are connected (e.g., swim lanes, flowchart).

RESPONSE TO REQUEST NO. 1:

Refer to Figures 1 and 2 below.

Figure 1. Liberty Risk Model Data Flow

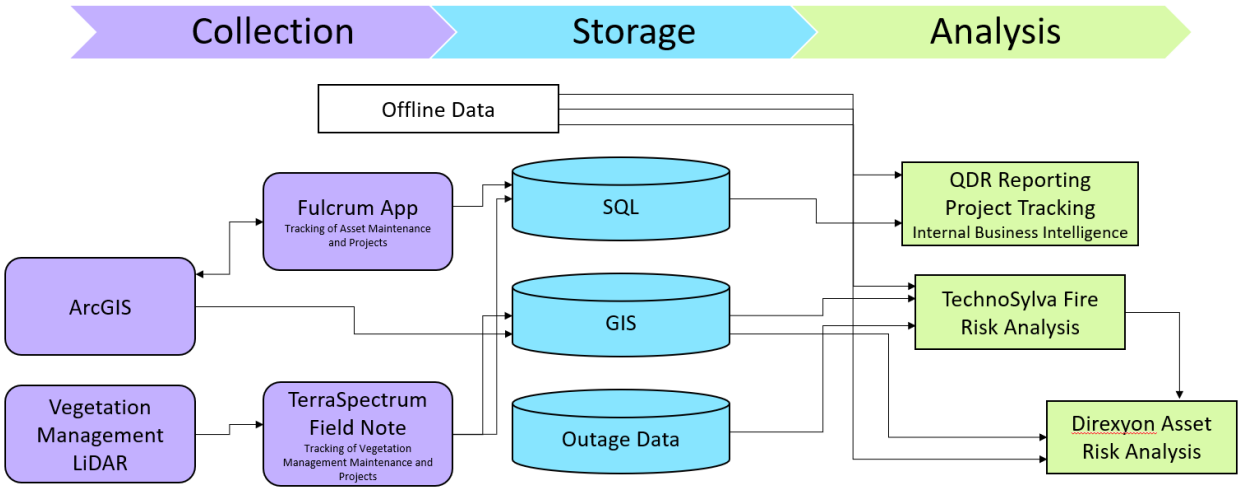
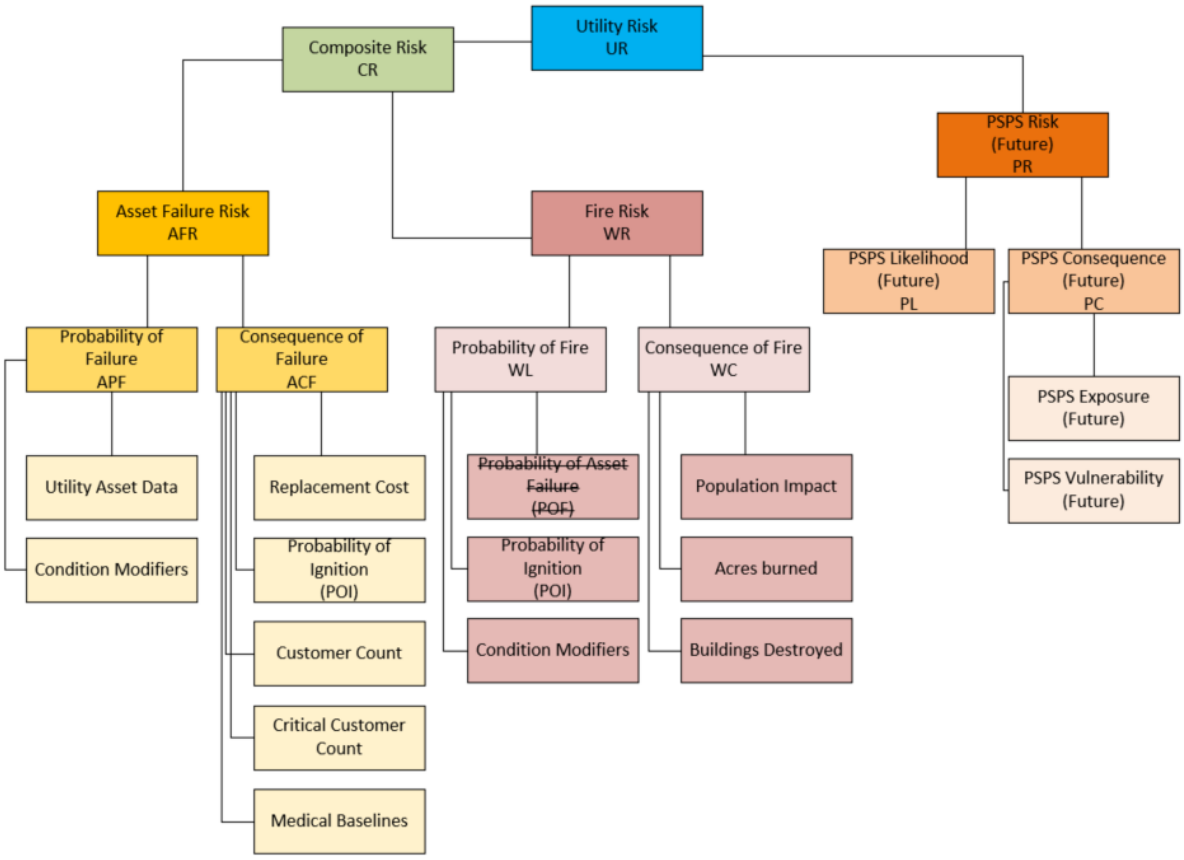


Figure 2. Liberty Risk Based Decision Making (RBDM) Framework



REQUEST NO. 2:

Regarding: data usage by model

Please provide data usage broken down by model (e.g., vegetation model, conductor model, transformer model, etc.) using the example table provided below. Include the following data usages:

i. Scale and geographical context.
ii. Topography.
    - Technosylva data
iii. Quality of historical outage, fault, and ignition data.
    - Technosylva data
    - Direxyon
        - Pole, Fuse, Veg, Conductor
iv. Usage of outage and fault events to augment ignition data.
    - N/A

v. Integration of potential ignitions avoided due to PSPS events.
    - N/A
vi. Asset data (including asset age, health, inspection results, type, etc.).
    - Technosylva data
    - Direxyon
        - Pole, Fuse, Veg, Conductor
vii. Impacts of system hardening and other initiative efforts.
    - Direxyon
        - Pole, Fuse, Veg, Conductor
viii. Climate conditions (include historical wind conditions, relative humidity, temperature, etc.).
    - Technosylva data
ix. Vegetation (include type, density, height, etc.).
    - Direxyon – Vegetation Management
    - Technosylva data
x. Fuel characteristics (include load, size, continuity, vertical arrangement, moisture, etc.).
    - Technosylva data
xi. Impacts of routine and enhanced vegetation management activities (including tree trimming, tree removal, inspections, etc.).
    - Direxyon – Vegetation Management
xii. Frequency of updates to datasets and inputs, including any associated triggers to determine the need for updates.
    - Annually or Bi-Annual as seen fit
xiii. Accuracy and quality checks for data and inputs.
    - Each time updates to datasets are made

RESPONSE TO REQUEST NO. 2:

Refer to Table 1 below regarding Liberty's data usage by risk model. The models in Table 1 are components of Liberty's Utility Risk and Composite Risk models that are under development. Data usage attributes for models in Table 1 propagate up to the Utility Risk and Composite Risk models, as shown in Figure 2 of Response 1.

Table 1. Liberty Data Usage by Model

Data Usage	Model 1 Asset Failure Risk	Model 2 Fire Risk	Model 3 PSPS Risk
Scale and geographical context	Circuit, segment, and asset level granularity for outputs.	2km spatial resolution and 30 meters for other landscape inputs and 30 meters for ignition raster map	N/A
Topography	Asset Failure risk model accounts for a percentage for a probability of ignition, which is produced by Model 2 (Fire Risk)	1. Terrain – elevation, slope, aspect 2. Surface fuels (Scott & Burgan 2005) 3. Canopy fuels a. Canopy height b. Canopy base height c. Canopy bulk density d. Canopy closure 4. WUI and Non-Forest Land Use classes (Technosylva, 2020)	N/A
Quality of historical outage, fault, and ignition data	Outage data prior to 2018 is not of sufficient quality and availability for modeling.	Outage data prior to 2018 is not of sufficient quality and availability for modeling.	N/A
Usage of outage and fault events to augment ignition data	2018 – Present Utility Outages and Faults	2018 – Present Utility Outages and Faults 2014 – Present Ignition Data	N/A
Integration of potential ignitions avoided due to PSPS events	N/A	N/A	N/A
Asset data (including asset age, health, inspection results, type, etc.).	2020 – Present Inspection history Asset Age Asset Health Asset Type Asset Material	Asset Age Asset Health Asset Type	N/A
Impacts of system hardening and other initiative efforts	Changes to Asset attributes since previous modeling updates Utility and Fault Data since previous modeling updates	Changes to Asset attributes since previous modeling updates Utility and Fault Data since previous modeling updates	N/A

Climate conditions	N/A	Weather and Research Forecasting Data Modeling Wind, Humidity, and Temperature at a 2km spatial resolution given 30 year weather history	N/A
Vegetation	Vegetation Type Historical Grow-In Historical Fall-in	Vegetation type, size, and vertical arrangement Dead and living material	N/A
Fuel characteristics		Vegetation type, size, and vertical arrangement Dead and living material Fuel Moisture	N/A
Impacts of routine and enhanced vegetation management activities	Tree trimming, tree removal, inspections		
Frequency of updates to datasets and inputs, including any associated triggers to determine the need for updates	Annually	Bi-Annually	
Accuracy and quality checks for data and inputs	Data Cleansing of input data (Accounting for asset attributes that are unavailable due to historical data quality issues)	Use of reliable sources relies on quality data	N/A

REQUEST NO. 3:

Regarding: model descriptions

Please provide model descriptions for ignition, consequence, and PSPS models using the example table provided below. Include the following descriptions:

i. Algorithms used and machine learning capabilities.
ii. Inputs for the model.
iii. Outputs for the model.
iv. Description of any modules used, including but not limited to:
(1) Climate change.

(2) Ingress and egress.
(3) Suppression.
(4) Conflagration risks.
(5) Smoke impacts.
(6) Community vulnerability.

v. Modeling components, linkages, and interdependencies.
vi. Weight of each data component and input.
vii. Automatization implemented.
viii. Frequency of model updates, including the basis for each update.

RESPONSE TO REQUEST NO. 3:

Liberty will provide detailed model descriptions, including inputs, outputs, and modules in its 2025 WMP update.

REQUEST NO. 4:

Regarding: model outputs

Please provide how model outputs are analyzed and utilized for each model using the example table provided below. Include:

i. Confidences for each modeling component, including how such confidences were determined.
   - Technosylva's QA and Reviews

ii. Range of uncertainty for model outputs, including how those ranges are determined and how uncertainty is minimized.
   - Technosylva's QA and Reviews

iii. Systems used to verify the model outputs, including verifier (subject matter experts, third- party) and mechanisms for implementing lessons learned.
   - Technosylva's QA and Reviews

iv. How uncertainty affects the interpretations of model outputs.
   - Technosylva's QA and Reviews

v. Determination of highest risk areas based on model outputs.
   - Largest risk scores

vi. Use of subject matter expertise for inputs and further verification.
   - As much as possible but limited due to immaturity of our model

vii. Scaling of outputs in final determinations.
   - Inconclusive determination for scaling of outputs

viii. Risk tolerances used for decision-making.
   - N/A

RESPONSE TO REQUEST NO. 4:

Liberty will provide detailed model descriptions, including outputs and their uses, in its 2025 WMP update.

REQUEST NO. 5:

Regarding: description of any collaborations among the utilities

Please provide a description of all collaborations previously undertaken among the utilities, as well as details on any known consistency across utilities, including:

i. What modeling approaches are already consistent.
ii. Which modeling approaches have the potential for more consistency and how approaches would benefit from consistency.
iii. Where consistency is infeasible or not necessary.

RESPONSE TO REQUEST NO. 5:

i. Liberty's use of Technosylva's Wildfire Analyst (WFA) product suite as a core component of its risk-based decision-making framework is consistent with that of its peer SMJUs and other IOUs. Similarly, Liberty's work with Direxyon to develop composite risk scores from asset and Technosylva data is also consistent with other IOUs' models. Finally, Liberty focuses on modeling best practices shared by its peer IOUs during the Risk Model Working Group sessions, leading to consistencies in fundamental model design between utilities.

ii. Liberty is developing core components of its Risk Based Decision Making framework and risk model. Liberty is focused on putting its core risk model into production and reaching a level of consistency with the other IOUs, in that the model can provide actionable insights for mitigation work.

iii. It may be unnecessary for Liberty's risk models to reach the levels of sophistication in the large IOUs' models; however, Liberty will continue to follow best practices and implement improvements.

REQUEST NO. 6:

Regarding: description of any additional collaborations

Please provide a description of all collaborations previously undertaken and/or ongoing with other entities.

RESPONSE TO REQUEST NO. 6:

Beyond its involvement in the Risk Model Working Group, Liberty has met with peer SMJUs PacifiCorp and Bear Valley to discuss modeling practices and collaboration with Technosylva

and Direxyon Technologies.

REQUEST NO. 7:

Regarding: attachments

Please provide attachments of:

i. All internal or third-party validations completed, and
ii. Description of any peer review of risk models utilized.

RESPONSE TO REQUEST NO. 7:

Liberty does not currently have an internal model validation procedure. Please refer to section 2.3.4 of attachment: "TSYL_LibertyWMP_ModelDocumentation_2024" for details regarding Technosylva's independent review process for their WFA product.

If you have any questions or require any additional information, please contact me at:

Jordan Parrillo
Manager of Regulatory Affairs
Liberty Utilities (CalPeco Electric) LLC
701 National Ave,
Tahoe Vista, CA 96148
Telephone: 530-721-7818
jordan.parrillo@libertyutilities.com