2020 WMP Risk Model Whitepaper

# Model Framework

SCE leveraged the RAMP model that was used in the SCE 2018 RAMP filing as the backbone for calculating risk reduction and RSE in the 2020-2022 WMP. As background, Chapter 2 of the RAMP report discusses in detail the risk bowtie methodology and how MARS (Multi Attribute Risk Score) is used as the currency of risk. In this iteration and as part of continually improving risk methodology and processes, SCE incorporated two new functionalities: 1) useful life of the asset and 2) Risk Spend Efficiency (RSE) based on incremental deployment. These two concepts are further discussed below in the next sections.

## Risk Reduction Methodology

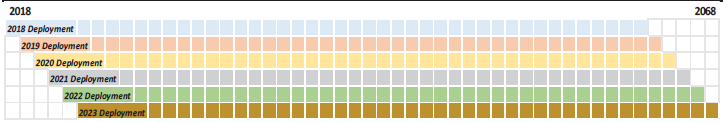
The following are the primary inputs to the model:

|  |  |  |
| --- | --- | --- |
| Input | Description | Example |
| Exposure | Overall scope of the risk | Number of circuit miles in HFRA |
| Scope | Forecasted yearly deployment of mitigation “widgets” | Incremental number of covered conductor circuit miles deployed by year |
| Useful life | Estimated lifetime of the mitigation asset | Estimated lifetime of covered conductor is 45 years |
| Mitigation effectiveness (ME) | Estimated risk reduction percentage at the risk driver(s) or consequence(s) level, based on 100% deployment | Estimated 60% reduction for the vegetation risk sub-driver |

Below are the steps to calculate the annual risk reduction[[1]](#footnote-1):

1. Calculate the Baseline risk – SCE used the average historical ignitions in HFRA, over 2015-2019, as the starting set of ignition frequency broken down by risk driver to calculate the baseline risk. This calculation can be found in SCE’s model file (worksheet: BASELINE\_DISTR)
2. “Scaled ME”: In most cases, it may take several years to fully deploy a mitigation program. Accordingly, the ratio of incremental scope and exposure is multiplied by the ME in order to calculate a scaled mitigation effectiveness for that particular scope of deployment. For example, if the exposure is 100, scope is 10, and the Mitigation effectiveness (ME) is 25%, then the “Scaled ME” is
3. Use this Scaled ME and multiply it with the corresponding risk driver it mitigates to get the residual frequency. For example, the vegetation risk driver has a baseline frequency of 10 and the Scaled ME is 2.5%. The residual frequency after deploying this mitigation is 10 \* (1 – “Scaled ME”) = 10 \* (1 - 2.5%) = 9.75.
4. Recalculate the new risk score using the new set of scaled down residual frequency by risk driver.
5. The risk reduction is the difference between the Baseline risk and this new risk score.
6. The risk reduction for subsequent years is based on the difference in risk score from the previous year, except in years where the useful life is reset.

SCE utilizes useful life to incorporate the benefit stream of the mitigation deployment. In the figure below, each year of deployment has a benefit stream.



For this example, if a mitigation asset has a useful life of 45 years, the annual risk reduction score is multiplied by 45.

The benefit stream is then net present valued using a discount factor of 3%[[2]](#footnote-2).

## Risk Spend Efficiency Methodology

The annual risk spend efficiency is the ratio of risk reduction (calculated above) and spend in the deployment year, where spend is in constant 2019 dollars.

As discussed in the 2020 WMP, there are limitations in using RSEs as the only metric in determining a risk mitigation plan.

“*The RSE metric does not take into account certain operational realities, including planning and execution lead times, resource constraints, work management efficiencies, an activity’s total risk reduction potential on targeted areas of the system, and regulatory compliance requirements. SCE considers these additional factors while determining the type and volume of work undertaken to reduce wildfire risks in a timely manner, while managing customer impact of mitigation measures*.”[[3]](#footnote-3)

# Model Worksheet Flow

Below is a summary of the primary worksheets in the model.

|  |  |
| --- | --- |
| Worksheet Name | Description |
| BASELINE\_DISTR | Baseline risk calculation for HFRA - Distribution |
| BASELINE\_TRANS | Baseline risk calculation for HFRA - Transmission |
| Summary | Summary page of the risk reduction and spend for each of the mitigations that SCE scored. The “Mitigation ID” column is the name of the corresponding worksheet where the mitigation inputs and calculation for that particular mitigation resides. |
| M01, M02, etc…. | Each of these pages contains the risk reduction calculation for a specific mitigation. Input cells are in green. |
| Master Detail Summary Sheet | Long term forecast of scope and spend for wildfire activities |
| SPEND | Summary of forecasted spend (O&M and Capital) from the Master Detail Summary Sheet |
| UNITS | Summary of forecasted mitigation activity scope from the Master Detail Summary Sheet |

There are other supporting worksheets that tie directly to certain mitigations. These links and references can be found in the corresponding individual mitigation activity worksheets (e.g. M01, etc..)

1. A comprehensive example to calculate risk reduction is provided in SCE’s RAMP filling, Chapter 2, Section I. [↑](#footnote-ref-1)
2. *See* Centers for Disease Control and Prevention, Dataset Number SD-1002-2017-0, *Economic Burden of Occupational Fatal Injuries in the United States Based on the Census of Fatal Occupational*

   *injuries, 2003-2010* (August 2017) (citing 1996 recommendation from U.S. Department of Health and Human Services Panel on Cost-Effectiveness in Health and Medicine). [↑](#footnote-ref-2)
3. SCE 2020-22 Wildfire Mitigation Plan, page 6. [↑](#footnote-ref-3)