SCE Risk Spend Efficiency Workshop Presentation

Prepared for: Office of Energy Infrastructure Safety

Risk Spend Efficiency Workshop Dec. 9, 2021

Risk Calculation Methodology

Multi-Attribute Value Framework (MAVF)

MAVF, per the S-MAP Settlement, provides a calculation framework to aggregate different consequence attributes into a singular multi-attribute risk score "MARS".

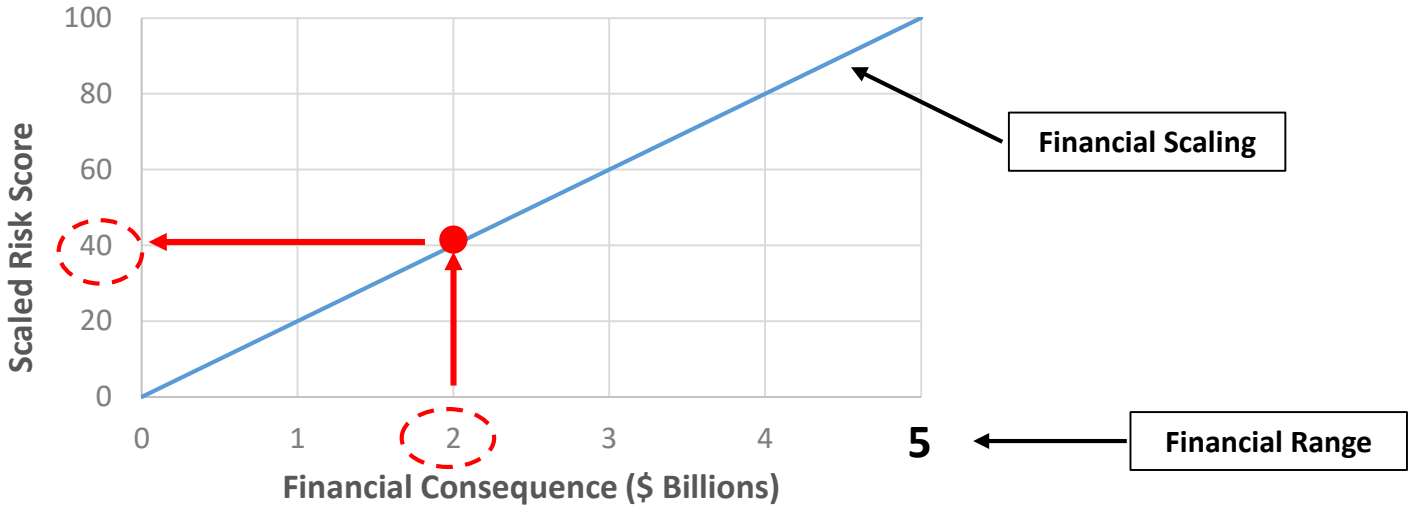
Attribute	Unit	Weight	Range	Scaling
Safety	Index[1]	50%	0 - 100	Linear
Reliability	CMI	25%	0 – 2 Billion	Linear
Financial	$	25%	0 – 5 Billion	Linear

*[1] Safety Index = 1.0 * (# of fatalities) + ¼ * (# of serious injuries)*

- This MAVF was described and used in the 2021 WMP
- SCE's safety weighting of 50% meets the minimum threshold of at least 40% as set forth in the S-MAP Settlement.

Illustrative Example of MARS Calculation

Example below will highlight how the different MAVF components (weights, ranges, scaling) work together to calculate a Risk Score.



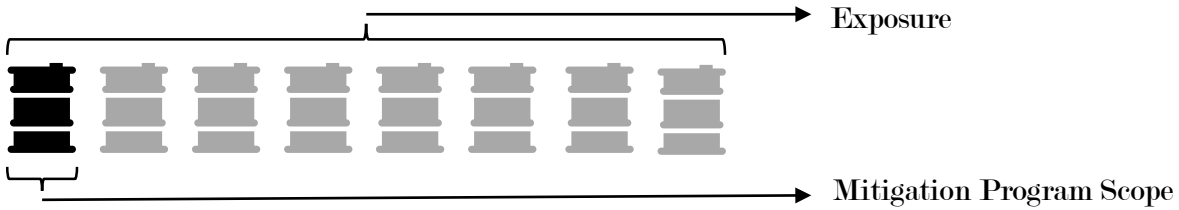
Step	Action	Value
(1)	Identify Consequence Value	$2 Billion
(2)	Determine Scaled Score	40
(3)	Identify Attribute Weight [Financial]	25%
(4)	Apply Weight to Scaled Score	25% * 40 = 10
(5)	Financial Risk Score (MARS units)	10

Risk Spend Efficiency Parameters

Exposure and Scope

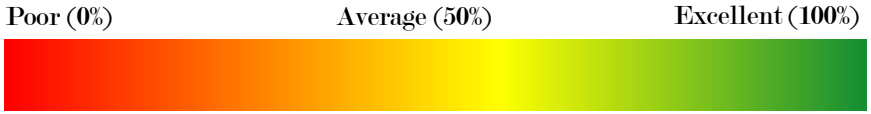
Exposure - the "total" population of the risk pie

Scope - how many "mitigation widgets" are deployed



Mitigation Effectiveness

Mitigation program effectiveness in reducing either the probability and/or consequence of a risk event



Useful Life

Mitigation program risk reduction benefit stream

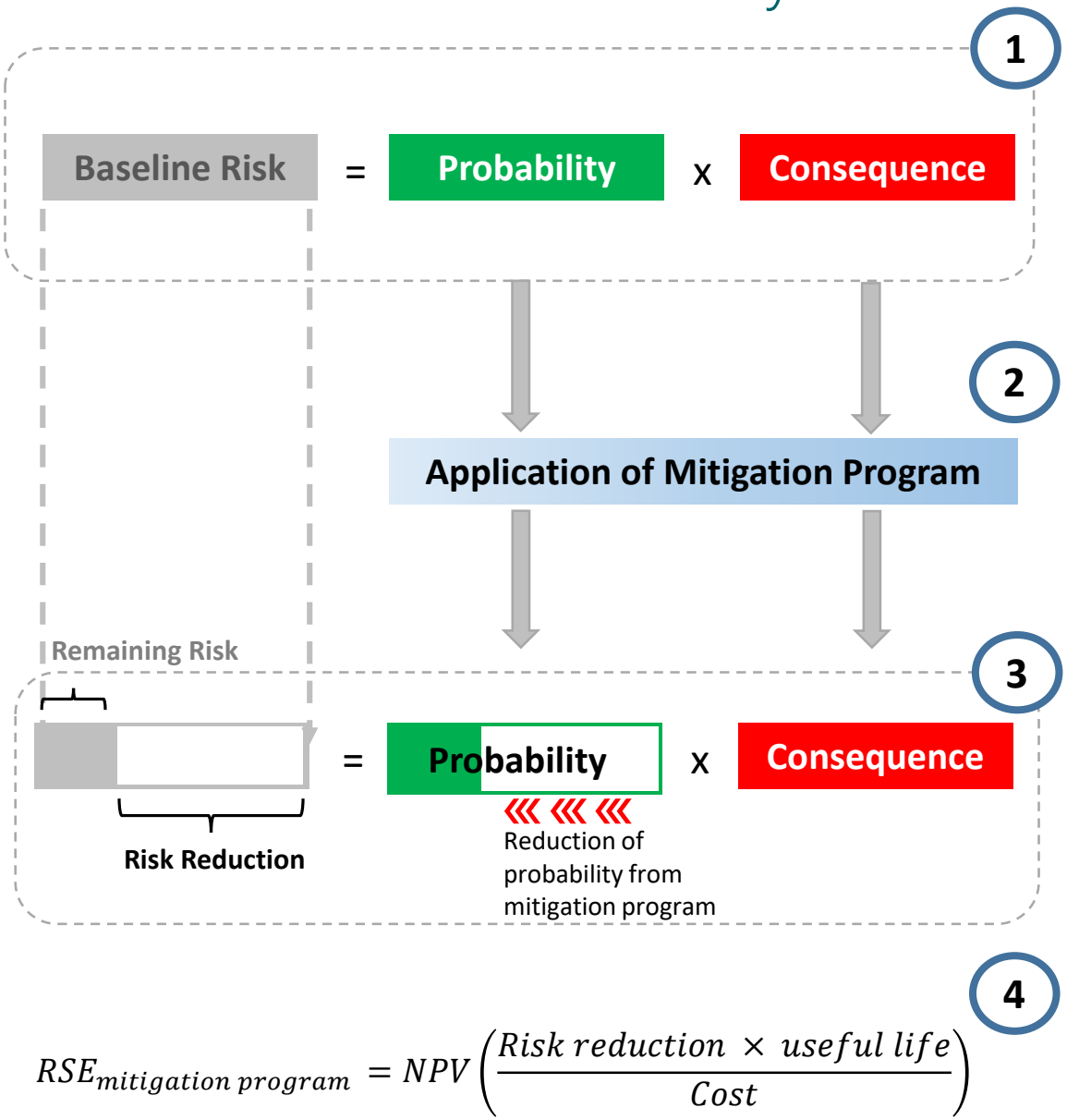
Multi-year (e.g. capital based programs) vs single year (O&M)

Cost

Mitigation program Cost

$

RSE Calculation Summary



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$$RSE_{mitigation\ program} = NPV\left(\frac{Risk\ reduction\ \times\ useful\ life}{Cost}\right)$$

Each asset has a distribution of **probabilities** at the risk driver level (e.g. animal contact, transformer failure, etc.) and associated **consequences** (safety, reliability, and financial)

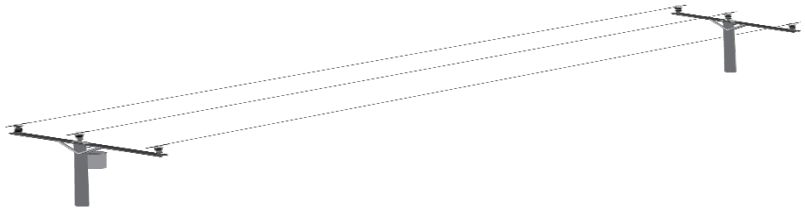
Each mitigation program has an associated **mitigation effectiveness**, reducing the probability (at the risk driver level) or consequence of a risk event.

Mitigated risk score is calculated based on a reduction in probability or consequence. The difference between baseline and the mitigated risk score is the **risk reduction**.

RSE is calculated by taking the benefit stream divided by cost.

Illustrative RSE Detailed Example – Part I

1 Baseline Risk



Probability

Risk Driver	POI
Animal Contact	10%
Balloon Contact	10%
Vegetation Contact	20%
Wire-to-Wire Contact	10%
Total	**50%**

✖

Consequences

Safety	Reliability	Financial
Population impacted based on Technosylva consequence simulation which in turn is translated into the Safety index	Eight hours of interruption per customer on the circuit.	Buildings and acres impacted based on values from Technosylva WRRM which is then translated to financial dollars
10 (Safety index)	400,000,000 CMI	$2 Billion
Convert to MARS		
5	5	10
Total MARS		
	20	

Baseline Risk Score = 10

Illustrative RSE Detailed Example – Part II

2 Mitigation Program

Probability		Mitigation Program	
Risk Driver	**POI**	**Effectiveness**	**Remaining POI**
Animal Contact	10%	**0%**	10%
Balloon Contact	10%	**0%**	10%
Vegetation Contact	20%	**25%**	**15%**
Wire-to-Wire Contact	10%	**50%**	**5%**
Total	**50%**		**40%**

3 Risk Reduction

Remaining Risk

*40% * 20 = 8*

Remaining POI *MARS Consequence*

Risk Reduction

Baseline Risk – Remaining Risk

10 – 8 = 2

4 RSE

Assume 5 years benefit stream and $1 program cost first year only

Y0	Y1	Y2	Y3	Y4
2	2	2	2	2

RSE

NPV benefit stream at 3% and divide by cost = **9.2**

RSE Calculation Improvements

- In general, all RSE components will continue to be refined over time
- Important to note that D.18-12-014 set forth the prescribed framework and methodology for calculation of RSEs in the RAMP report filing and ultimately the utility's General Rate Case showing.
- The Commission has opened a new proceeding, *Risk-Based Decision-Making Framework* (R.20-07-013) ("Risk OIR") to address clarifications or changes to D.18-12-014 and to attempt to provide a Risk Roadmap in Phase II of the proceeding. Topics may include Multi-attribute value framework development, risk tolerance, etc. that could lead to RSE calculation changes.

Risk Estimate Verification Process

RSE Estimate Verification Process

- Breaking down an RSE equation to its individual components can lend insight as to where the uncertainty may lie.

RSE Component	Data Fidelity
Cost	This component has the highest level of certainty. SCE tracks costs at the unit level.
Useful Life	This component can be informed by the manufacturer's claim, depreciation schedule, contractual terms, or SME judgment. This component has the next highest level of certainty.
Mitigation Effectiveness	A program's mitigation effectiveness is either at the risk driver or consequence level. SCE strives to use internal data where possible, supplemented by external data/benchmarks and informed by SME judgment. Some mitigation programs lend themselves to a more data rich environment due to factors such as program longevity while others are still maturing and may need many more years of data gathering to reduce the uncertainty.

RSE Mitigation Effectiveness Process

- SCE has a governance process to validate mitigation effectiveness values that consists of working sessions with SMEs, reviews with management, and challenge sessions
- Mitigation effectiveness values are based on engineering science, benchmarking (including with CA IOUs), testing, research, historical data, and SME judgement
- Annual process to develop, review and update mitigation effectiveness values
  - Conduct multiple working sessions with various SMEs to assess, document, and estimate mitigation effectiveness including reviewing historical data, benchmarking, testing, etc.
  - Meetings with management to review estimates and supporting documentation
  - Challenge sessions with mitigation program owners and SMEs to review and assess validity of inputs and assumptions
  - Discussions also include evaluating effectiveness not only within the mitigation program itself (e.g., do the mitigation effectiveness values of each risk driver make sense) but also evaluate across mitigations (e.g., why is the mitigation effectiveness for a particular risk driver higher in Program A vs Program B)

RSE Mitigation Effectiveness Improvements

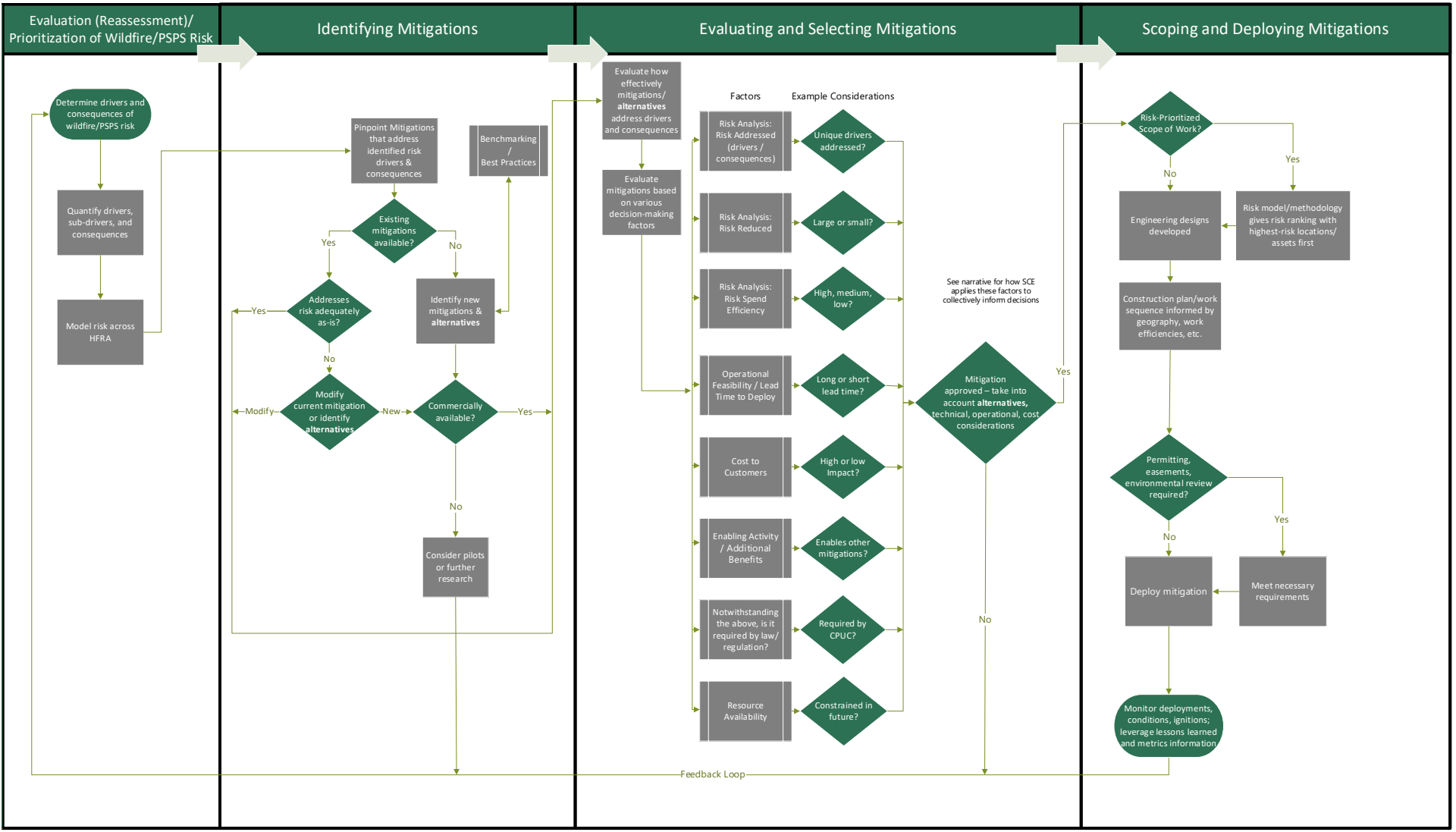
- Engaging the other IOU's to further triangulate the long-term mitigation effectiveness for covered conductor, vegetation line clearing, and other alternatives
  - For example, as part of the Joint IOU Covered Conductor Effectiveness Working Group, the utilities will be conducting additional lab testing and benchmarking, and will be compiling utilities' recorded results to further inform covered conductor effectiveness
- Revisiting mitigation programs not previously scored and developing mitigation effectiveness estimates to calculate additional RSEs
- As mitigations have been in service over longer periods, we expect to collect more data that will help refine the mitigation effectiveness estimates

Initiative Selection Process

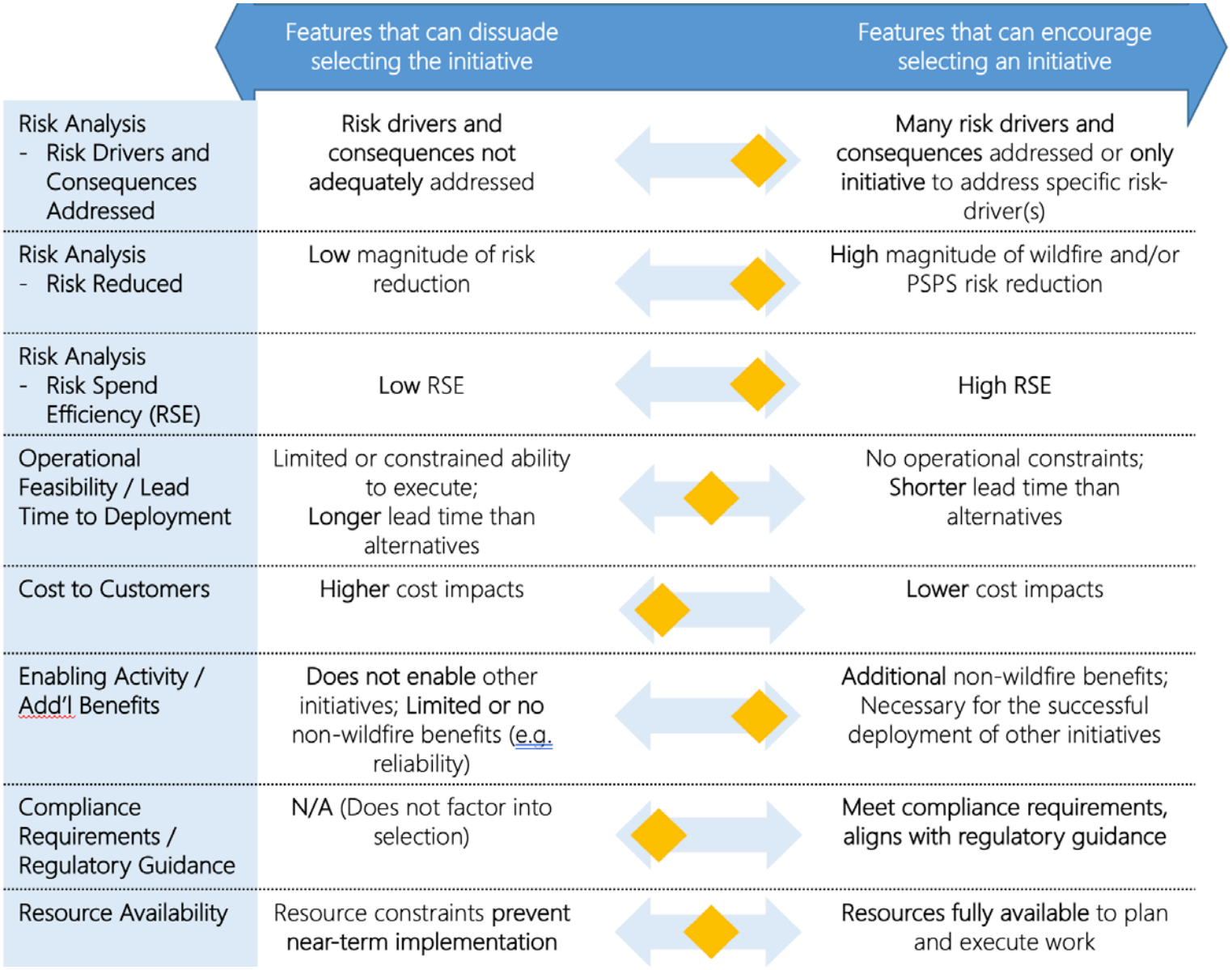
Initiative Selection Process

- For Critical Issue SCE-02, SCE's June 3, 2021 Revised 2021 WMP Update provided a detailed narrative explanation and graphical representation of its general process for selecting Wildfire and PSPS mitigations
- In its Final Action Statement, OEIS found that SCE's response to Critical Issue SCE-02 "adequately addressed all parts of this critical issue" and that SCE's work product "brings clarity to the decision-making process by illustrating factors such as 'risk reduced' and 'RSE' are weighted more heavily than 'operational feasibility' and 'compliance requirement'"
- Going forward, SCE intends to further utilize RSEs to inform mitigation decisions where appropriate and reasonable

Overview of General Decision-Making Process for Wildfire/PSPS Mitigations



RSE Compared to Other Decision-Making Factors (Covered Conductor Example)



Questions?