*Southern California Edison*
*2023-WMPs – 2023-WMPs*

**DATA REQUEST SET CalAdvocates-SCE-2023WMP-08**

**To: Cal Advocates**
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**Response Date: 4/10/2023**

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**Question 14:**
Referring to section 8.1.2.2.1 Targeted Undergrounding (TUG), on pp.256 – 257 of your WMP, SCE states that:
Because of these topographical challenges with some existing overhead lines, vehicle access required for installing underground cable is not available, which makes undergrounding along the same route impractical. Therefore, overhead lines may need to be brought out to the public right-of-way for undergrounding, increasing the length of the undergrounding needed and significantly increasing the cost as well as the construction timeline.
Figure SCE 8-04 shows an example of a necessary re-route. The picture on the left shows the current overhead line path, crossing a steep, hilly terrain. The lines may need to be moved to the road to avoid environmental considerations associated with heavy equipment access to construct and/or maintain lines, as shown in the picture on the right. Re-routing requires an additional length of conductor, labor, and materials.
a) What is SCE's maximum acceptable ratio of underground to overhead miles for the TUG program, considering the increased costs and construction time associated with longer underground routes?
b) What factors or criteria does SCE use to decide whether to pursue undergrounding in different terrains?
c) Is SCE considering or adopting any innovative solutions or technologies to reduce the challenges posed by terrain, vegetation, and other obstructions to undergrounding?
d) For projects that require a significantly longer underground route compared to the overhead route, how does SCE weigh the benefits of undergrounding against the increased costs and construction timeline (when compared to installing covered conductor)?
e) Please provide examples of successful TUG projects where the underground route was longer than the overhead route yet the benefits outweighed the costs.
f) Please provide an example of a project where SCE decided against undergrounding because the added length of the underground route made it impractical or excessively costly.
g) Does SCE have any contingency plans in place for scenarios where the underground route proves to be impractical or excessively costly after the project has started?

**Response to Question 14:**

*a) What is SCE's maximum acceptable ratio of underground to overhead miles for the TUG program, considering the increased costs and construction time associated with longer underground routes?*

SCE estimates an average re-route factor of 20%, but individual projects can vary. SCE does not have a maximum re-route ratio for the TUG program. Each TUG project is evaluated holistically, and factors considered include SCE's Integrated Wildfire Mitigation Strategy (IWMS), evaluation of SME input on wildfire risk, construction feasibility/difficulty, projected project timeline, and cost as outlined on pp. 181-212. Also note that SCE's projected costs account for the re-route factor.

*b) What factors or criteria does SCE use to decide whether to pursue undergrounding in different terrains?*

See response in part a.

*c) Is SCE considering or adopting any innovative solutions or technologies to reduce the challenges posed by terrain, vegetation, and other obstructions to undergrounding?*

SCE is evaluating the ability to install underground cable systems at a shallower depth compared to standard undergrounding for county or city roads. By reducing the undergrounding depth of the cables, SCE could improve scoping in areas with geographical concerns, such as rocky terrain.

Additionally, SCE is considering innovative solutions related to route design and trenchless/tunneling. These potential solutions include:

- Subsurface geology detection to improve accurate detection of potential obstacles to reduce cost/time of undergrounding.
- Horizontal directional drilling technology to install small diameter cable conduit underground quickly and securely.
- Ground-level distribution systems that can be installed with a very shallow trench or no trench at all, where the electrical system is encased in a geopolymer cable tray and epoxy resin concrete.

Note that all preceding undergrounding techniques and technologies are still subject to evaluation and review.

*d) For projects that require a significantly longer underground route compared to the overhead route, how does SCE weigh the benefits of undergrounding against the increased costs and construction timeline (when compared to installing covered conductor)?*

See response in part a.

*e) Please provide examples of successful TUG projects where the underground route was longer than the overhead route yet the benefits outweighed the costs.*

Below is an example of a successful TUG project where the underground route is longer than the overhead route. Note that SCE has only installed approximately 20 miles of TUG as of year-end

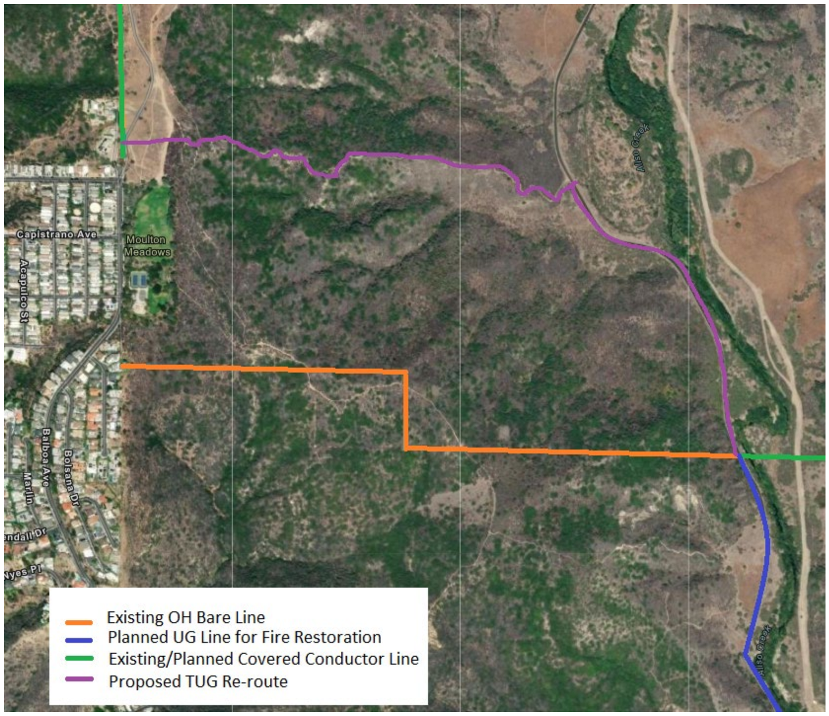
2022, and these projects were typically low difficulty [1]. Therefore, these completed miles only represent a small sample size and is not representative of future scope.

Additionally, SCE believes that undergrounding in Severe Risk Areas, where the threat to lives and property is elevated, is a prudent choice. As mentioned in part a, SCE's IWMS methodology, evaluation of SME input on wildfire risk, construction feasibility/difficulty, projected project timeline, and cost are considered when moving forward with an undergrounding project. For example, the below project, which was completed in 2021 for the Clarinet circuit, removed 0.15 miles of overhead conductor and installed 0.35 miles of undergrounding. SCE considers this location a Severe Risk Area because it is a burn-in buffer into egress location.


*f) Please provide an example of a project where SCE decided against undergrounding because the added length of the underground route made it impractical or excessively costly.*

SCE conducts feasibility reviews for proposed TUG projects. During this review, a team of planners, engineers, and other SMEs consider issues impacting constructability, such as local terrain and accessibility. In the following example, it was not feasible to underground the path of the existing overhead bare line (orange line). The potential reroute path (purple line) along a narrow dirt road to the north was assessed. However, due to accessibility concerns, environmental concerns, and feasibility concerns attributed to the re-route path, SCE ultimately decided against undergrounding.

[1] Low difficulty underground project are in flat and rural areas with the following characteristics: 1) straight/minimal bends in the route, 2) less civil construction due to existing infrastructure, 3) minimal paving and equipment needed, 4) low number of transformers per mile required.




*g) Does SCE have any contingency plans in place for scenarios where the underground route proves to be impractical or excessively costly after the project has started?*

SCE defines a project starting when it has started the initiate phase of the IPSEC process, which is the process of developing the scope based on risk data. During this phase a detailed scoping review is performed with local SMEs to help inform feasibility, designs, and other constraints to consider. Afterwards, detailed design commences where SCE will know with certainty if the project is practical and feasible. If the undergrounding project is deemed infeasible at any point in this process, SCE will review the project and identify the appropriate alternative. Alternatives may include the CC/REFCL++ portfolio, remote grid, or other grid hardening solutions.