

# Kino to DMP Transmission Line Project

CWG Questions and Responses			
No.	Origin	Question	Response
1	Feldman's, others	Our neighborhood would like more details about the design of the poles and lines for the project. Our neighborhood experienced a tornado in the 1990s that caused roofs to blow off and a power outage for days, and we've had microbursts. The neighbors are looking for info about the design in order to understand how climate change and the predicted increasingly intense storms will be anticipated in this project.	TEP utilizes and meets National Electric Safety Code (NESC) requirements for transmission line design, taking into consideration line tension, wind speed, gravity, and temperature.  In 2011, TEP analyzed 50 years of wind data and determined that the minimum NESC requirements exceed Tucson's historical wind speeds, validating company standards and design criteria. TEP determined that we can accommodate over a 20 mph wind speed increase to historical Tucson wind speeds before the structure integrity is compromised.  National code requirements established by the NESC will evolve with storms accordingly based upon the latest research and weather data accumulated. The NESC is updated every 4 years.
2	Feldman's, others	We also have concerns about the risk of fires like California is experiencing.  Do TEP poles experience Corona Discharge, Is there a related fire risk?	As transmission operators, TEP is required to follow federal regulatory guidelines and maintain an active vegetation management program in order to minimize potential fire dangers. Throughout the year, we ensure that vegetation does not encroach on transmission line routes.  Aerial (helicopter) inspections are conducted twice a year with visual evaluation. We also inspect about 20 percent of our transmission lines every year from the ground. TEP designs transmission lines to maintain NESC clearances from existing structures, such as homes, street lights, trees, etc.  Wood poles in fire susceptible areas are treated with fire resistant coating.  Transmission poles themselves are not part of Corona discharge (can be visible as a glow. Corona discharge occurs when the air around an object becomes ionized. For transmission lines, corona can occur as a result of discontinuity in the conductor or hardware. An example would be a deep scratch on the conductor surface which can create corona.
3	Sam Hughes	TEP has stated that the need for new transmission lines is to "support University of Arizona and Banner University Medical Center" and "strengthen reliability [for] TEP customers in or near the study area." What percentage of cost does each of these two categories contribute?	New transmission lines are needed to ensure that TEP can continue to provide reliable electric service to current and future residential and commercial customers in central Tucson, including the University of Arizona, Banner University Medical Center and multiple neighborhoods throughout the area.  TEP's service costs are allocated across all customer classes. TEP's rates are determined by the ACC in a public process that occurs after expenditures are incurred in a given test year. , as such at this time the percentage of costs incurred by various classes cannot be determined at this time
4	Sam Hughes	What is the vision and timeline for the completed "loop" in the TEP service area?	The "loop" discussed in previous meetings refers to the completion of the 138 kV interconnecting Kino Substation to the DeMoss-Petrie Substation, which would provide redundancy and improve reliability by allowing TEP to deliver energy from more than one direction to area customers. The scheduled in service date for this portion of the loop is May 2023.
5	Sam Hughes	Our service is designed on different steps in voltage supply than Phoenix. Why?	Different utilities developed their systems based on different parameters. TEP's system was largely developed initially with 46kv as its upper voltage for transmitting power around Tucson. 46kV is then usually stepped up to 138kV when additional capacity is required. The Phoenix area developed initially with 69kV as a typical system voltage. This voltage then typically steps up to 230kV.
6	Sam Hughes	Why are some 46 kV lines left off the TEP maps?	TEP is updating maps to include the 46kV system.
7	Sam Hughes	When new transmission lines are installed, will the old poles be removed?	In some instances, if a new transmission line is replacing an existing one, the old poles will be removed. If a new transmission line is being constructed near existing distribution lines, the old poles carrying the distribution lines may remain. Additionally, in some cases, a section of a new transmission line could be attached to existing transmission poles in what's called a 'double circuit' configuration. In TEP's final application to the ACC for approval of the new line, the company will identify poles and other equipment that would be removed.
8	Sam Hughes	When will our current rates go up?	TEP's rates must be reviewed and approved in a public process before the Arizona Corporation Commission. Information about TEP's current application for new rates can be found at <a href="http://tep.com">tep.com</a> . TEP has requested for new rates to become effective later this year. More information about TEP's request for new rates is available at <a href="http://tep.com">tep.com</a> .
9	Sam Hughes	We have been told that some facilities are 80 years old. Is it unusual for a substation to go 80 years without improvements?	TEP continually inspects, maintains and installs upgrades to our local electric system, which must be designed and built to withstand the rigors of summer heat, monsoon thunderstorms and other inclement weather while providing safe, reliable service to customers. While maintenance and repair is necessary, some facilities can operate for an extended period of time as designed without requiring replacement.
10	Sam Hughes	What has been the timeline of major improvements from 1940 to present, and how does that timeline match rate hikes? How does it correspond to returns on investments for stakeholders?	TEP provides service to more than 425,000 customers with a modern electrical grid that spans 1,155 square miles and includes approximately 5,100 miles of transmission and distribution lines, more than 4,300 cable-miles of underground distribution lines, nearly 100,000 power poles and transmission structures and more than 100 substations.  Developing a detailed 80-year timeline as described would be difficult. TEP's rate of return is determined through a public rate-making process before the Arizona Corporation Commission.  Since 2015 alone, system investments include:  \$343 million of upgrades to TEP's distribution system, which delivers electric service to customers' homes and businesses. This work includes building and upgrading substations, power lines and power poles throughout TEP's service territory. \$149 million in improvements to TEP's transmission system. \$444 million in upgrades for TEP's existing generating resources.
11	Sam Hughes	What percentage of the TEP service area is underground?	Transmission (> 138kV) - 0% Subtransmission (46kV) - 2% Distribution (4.16-13.8 kV) - 64%
12	Sam Hughes	Where has TEP buried lines?	TEP maintains underground facilities throughout its territory. In many new housing communities, electric service is delivered through buried service lines. TEP and the developer collaborate to cover the costs of underground facilities.
13	Sam Hughes	Would TEP object to a plan to bury the new lines under Park Avenue and make that congested street exclusive to bikes, streetcars and pedestrians?	TEP would not object to such a plan by the City and affected neighborhoods as long as incremental costs for underground facilities are considered during development.
14	Sam Hughes	TEP has stated that the cost differential (overhead to underground) would be \$1 million to \$10 million per mile in 2019. What evidence is this based on?	As previously stated, TEP has solicited a study to validate the costs of undergrounding transmission lines in TEP's service territory. This study should be completed shortly.

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15	Sam Hughes	At the Ward 6 public open house meeting, it was stated by a TEP representative that underground lines are dangerous. Does this apply to all buried lines? Does it depend on their construction? Does TEP have the ability to build safe underground lines?	<p>All energized electrical equipment could present a potential <i>electrical</i> safety concern, including underground facilities. For example, underground facilities could be damaged if a tree is uprooted during a thunderstorm or if a ground-mounted electrical cabinet is damaged by a vehicle.</p> <p>Through a large body of research, scientists have confirmed no adverse health effects caused by exposure to low-level electric and magnetic field (EMF) levels associated with electrical equipment. However, some customers have expressed concerns about this issue. EMF strength decreases as you move farther away from the source. More information about EMFs is available at <a href="http://tep.com">tep.com</a>.</p>
16	Sam Hughes	What is the history of maintenance for underground lines where they exist in the TEP service area? Can we itemize those costs?	Some of the early implementations of underground distribution lines are reaching their design life and experiencing failures. TEP does not have any transmission level underground lines and therefore has no history or cost experience.
17	Sam Hughes	If we were to move forward with underground lines, what would the unusual costs be? Can we find ways to reduce these costs? For example, what part of "trenching" costs is labor? Does this labor force currently exist? Are there perhaps funds to train specific populations for technical jobs?	These are items TEP will be better able to address once the undergrounding cost report is completed.
18	Sam Hughes	Can we have an independent assessor for determining the costs of undergrounding?	TEP's study is being performed by a third party consultant. Should anyone want to commission an independent study they may.
19	Sam Hughes	Does TEP have studies based on other southwestern cities' experiences of undergrounding?	TEP does not have specific studies from other city's.
20	Sam Hughes	How can we develop a rate schedule for differentiated services (overhead and underground)?	Rate schedules are developed by TEP in conjunction with the ACC. If customers want to develop an undergrounding district, specific rate schedules can be developed.
21	Sam Hughes	How will the new solar supplies influence the reliability of our service, the nature of our infrastructure, and our rates?	Renewable energy is not available at all times, and requires either conventional resources or energy storage systems to provide reliable service to customers. Energy storage is in its infancy and is very costly to add with renewable projects. TEP takes these items and potential reliability impacts throughout its long-term resource planning process. Large, community-scale wind and solar projects are usually the most cost effective renewable options available, but require sufficient transmission infrastructure to deliver the power to where it is needed.
22	Sam Hughes	Announcements have been made about the TEP and UA partnership to make the UA power source completely solar. Will this installation be exclusively for the use of the UA?	No. Three new large renewable energy projects online by 2021, allowing TEP to produce more than 28 percent of its power from renewable resources. TEP will dedicate portions of a new wind project and a new solar energy project to serving some of the UA's energy needs.
23	Sam Hughes	What are the dates and locations for the Community Working Group and public open house meetings in 2020?	The next CWG meeting is set for February 12, 2020.
24	Sam Hughes	Will future public open house meetings be conducted in a style that allows all in attendance to simultaneously take part (rather than a walk-around as was planned for the first meeting in 2019)?	TEP will provide a presentation at the next CWG meeting in early 2020, followed by the open house format. At TEP-hosted public meetings, the company typically solicits and captures public input using the open house format.
25	Sam Hughes	One week is not an adequate amount of time to respond to TEP plans. Will we be advised of plans changes with at least three weeks to respond?	As indicated in our project schedules TEP is striving to give as much advance notice of our project to be able to solicit valuable feedback.
26	Sugar Hill	Can TEP define terms familiar to TEP yet not familiar to the CWG members, e.g. load center, and other terms.	Yes, please see attached.
27	CWG Meeting 2	What is the Purpose and Need of the Project?	Energy demands in the project area have grown over time and the existing radial 46kV sub-transmission system is becoming loaded to the point of maximum capacity. This increased energy demand not only creates concerns about overload conditions and reduces TEP's ability to restore service to customers in the area in the event of an outage. A new 138kV looped system will provide additional capacity and improve reliability, reducing dependence on the existing 46kV system. The 138kV loop also will add additional contingency capacity to the existing adjacent 46kV substations.
28	CWG Meeting 2	What are the minimum vertical and horizontal clearance for the line?	Vertical 15.7' over roof, or 9.7' horizontal clearance, 25' above ground height.
29	CWG Meeting 2	Cost sharing of underground costs with U of A and Banner.	TEP installs its transmission lines overhead. There are methods available for entities to create an undergrounding district to cover incremental costs of underground transmission and TEP is willing to discuss and consider such a mechanism.
30	CWG Meeting 2	What wind capacity are the structures designed to handled?	The poles are designed to the extreme wind case, which is 90mph. District loading case is 93mph.
31	CWG Meeting 2	How tall does the 138 kV pole need to be if it is double circuited.	The height is variable depending on surrounding circumstances, but is typically 75-110 feet tall.
32	CWG Meeting 2	Why didn't we have a say in the location of the UA North Substation?	Substation location is a planning function determined by TEP planning studies. A load center is basically the center of an area of energy demand equivalent to approximately 80 MW, which is the design standard for TEP 138kV substations. As TEP studied its system in the central portion of the city, it determined that the load center for purposes of siting a substation was in the vicinity of the identified UA North Substation. TEP's Land Department was tasked with finding potential substation sites in the vicinity that could accommodate a 138kV substation. During the process, it was determined that the proposed location was one of the few sites large enough and the only location the UA was agreeable to selling.
33	CWG Meeting 2	What is the depth of underground distribution?	Dependent on voltage. 4.16 kV is 3'-0" to the bottom of the uppermost buried 4" conduit. 13.8 kV is 4'-0" to the bottom of the uppermost buried 6" conduit.
34	CWG Meeting 2	What is the required ROW width? Why is less for road ROW?	The typical ROW width for a 138 kV transmission line is 100-feet wide. This width not only allows for the transmission line facilities, but also access to the facilities. When public road right of ways are available, the easement right of way width can be less because access is available from the public road and facilities can be placed within them. TEP's franchise agreements with the City and Pima County allow for placement of the transmission line in the public road right of ways.
35	CWG Meeting 2	Why is the existing 138 kV system circling the city, instead of being through the city? Was this intentional because health or safety?	For decades, TEP's system consisted of 46kV service to load. As energy needs increased and more capacity was needed, TEP developed a 138kV loop around the city with 138kV substations providing service to the existing 46kV system. As Tucson continued to expand, development typically occurred around Tucson's core. With recent efforts to develop in-fill projects to reduce urban sprawl, load density within the core of the city has increased, putting pressure on the aging 46kV system. This necessitates the development of new 138kV facilities with greater capacity through the city.
36	CWG Meeting 2	The "Thrive in 05" collaborative is planning to revitalize certain areas along Stone Ave. TEP should seek the organization's input before determining routes that would impact their plans.	TEP has reached out to the organization to request revitalization plan information. Thrive in 05 representatives have also been invited to participate in future CWG meetings.
37	CWG Meeting 2	Are there any alternative substation "types" or an alternative gas that can be used in the GIS?	Please see attached "TEP Response to SF6 Questions".

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38	Ward 6	What is the difference between the stakeholder group and the CWG?	<p>Stakeholders are technical experts representing other utilities and governmental jurisdictions that can provide information related to how the project may directly impact their facilities.</p> <p>CWG members are the representatives of their neighbors and constituents that can provide unified perspectives to TEP and other CWG members, and also share information with the neighborhood or other constituency they represent</p> <p>In addition, all members of the public are invited to participate in public open house meetings. Residents of neighborhoods participating in the CWG also are invited to participate individually.</p>
39	Ward 6	How are stakeholders/CWG members selected?	Once TEP develops a study area, it works to identify potentially affected neighborhoods, schools, jurisdictions, utilities and others that may be impacted. Throughout the process, TEP may identify additional stakeholders and CWG members that would benefit from participation.
40	JE Daniels & Others	Multiple questions about choice of GIS substation and SF6 Gas.	Please see attached "TEP Response to SF6 Questions".
41	CWG	Can TEP Underground the Lines?	<p>Transmission lines can be installed underground in some circumstances, but at considerable cost. TEP has solicited a study to validate the costs of undergrounding transmission lines in TEP's service territory. This study should be completed shortly and provided to the CWG by the end of January 2020.</p> <p>Additional costs for installing transmission lines underground would need to be borne by entities in the area that object to overhead lines. In addition, residents in those areas should be informed about the physical disruption that would be caused during construction of the facilities.</p>
42	Blenman-Elm	Is TEP looking at the potential impacts of the project on the Banner helipad?	Yes, as the project involves construction of permanent structures of significant height that will be located within 3.8 miles of the University Medical Center Heliport, a notification of the proposed construction will be required to be submitted to the FAA for an obstruction evaluation.
43		What is an orphan pole and why are there so many of them?	Some power poles also support equipment from other utilities, including cable and telephone lines, through joint-use agreements. When TEP relocates power lines or otherwise abandons a power pole, TEP usually will cut off the top of the pole, above where other utilities' equipment are attached. It is the responsibility of the remaining utilities to relocate their facilities. This can take a considerable amount of time and TEP has no authority to force their relocation.
44		What is under Park Avenue at the UA?	TEP does not have information regarding facilities under Park, possibly the City does.
45		Is it an option to use both sides of Vine (link 31)?	TEP will determine this during the alternatives analysis phase of the project.
46		Provide information about the load center and why subs/lines are needed in those locations.	See response to #32. The load center is a representation of the location of a planned 80 MW distribution area.
47		Why isn't 36th Street, west of Kino, a link?	Based on the siting work and hearings for the Irvington to Kino line there is no room for line to be installed along 36th in that vicinity.
48		Why can't we use the U of A's existing underground tunnels?	The existing underground tunnels would not accommodate a 138kV system in addition to existing U of A facilities.