State of California
Public Utilities Commission

FACT SHEET No. 2

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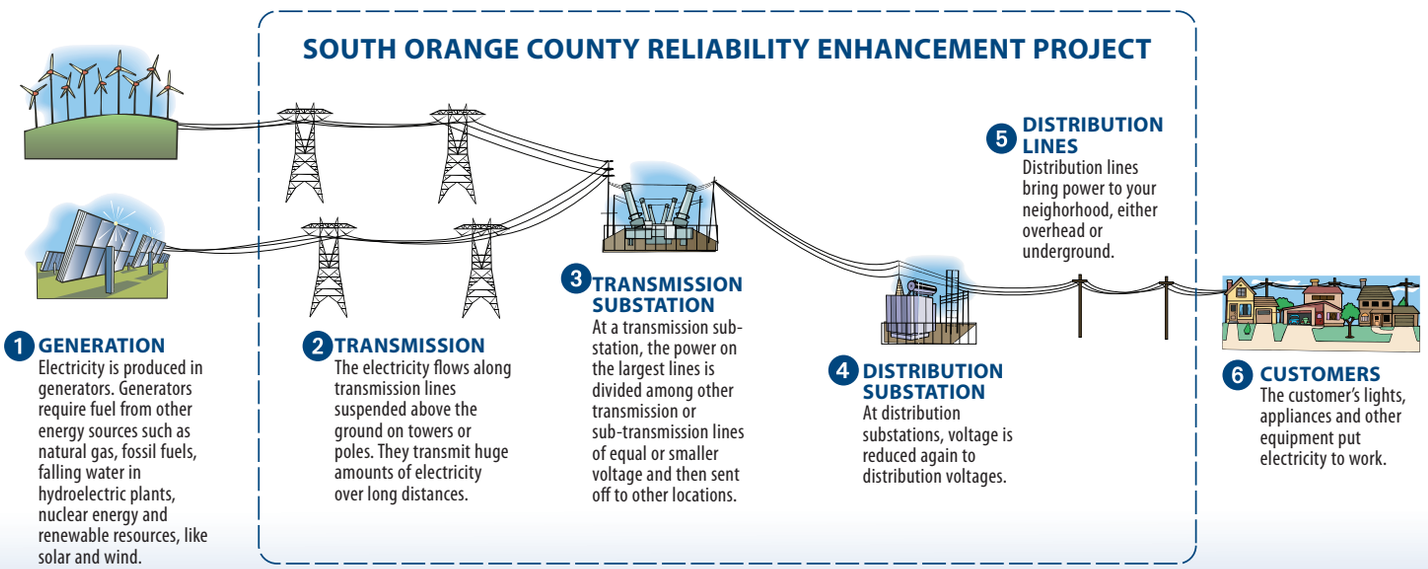
South Orange County Reliability Enhancement Project

What is a Transmission Project?

Electric transmission systems deliver electricity from power generating facilities in remote locations to consumers and businesses in our communities. To deliver large quantities of power more efficiently, power is transmitted using high-voltage transmission lines from the power generating facility to a transmission substation. At the substation, transformers are used to lower the voltage and distribute the power through subtransmission lines or distribution lines. Distribution lines deliver power to individual consumers. Another typical component of transmission systems is the telecommunications system, which sends signals to nearby substations to help monitor for system safety and reliability.

The goal of San Diego Gas & Electric's South Orange County Reliability Enhancement Project is to improve the reliability and capacity of the electrical transmission lines that run between the Capistrano and Talega substations, as well as upgrade the substations themselves. The project includes replacement of the existing Capistrano Substation, located in San Juan Capistrano, with a new, gas-insulated substation; replacement of a segment of San Diego Gas & Electric's 138-kilovolt electrical transmission line that runs from the Capistrano Substation to the Talega substation with a double-circuit 230-kilovolt transmission line; relocation of several distribution lines between the two substations; and upgrades to electrical infrastructure at the Talega Substation, on Marine Corps Base Camp Pendleton. About 140 transmission and distribution line support structures would be removed, and about 120 new support structures would be installed. If constructed, the project would help accommodate anticipated growth in South Orange County.

The Path of Electricity



Transmission Line Components

A key component of the South Orange County Reliability Enhancement Project is the transmission line, which is composed of transmission structures, conductors, insulators, circuits, ground wires, and communication lines.

The **transmission structure** is the most visible element of a transmission line. Although designs vary according to terrain conditions and height restrictions, common types of transmission structures include:

Lattice Steel Towers (LST), which consist of a steel framework that is bolted or welded together, and

Tubular Steel Poles (TSP), which are hollow steel poles consisting of 1, 2, or 3 pieces.

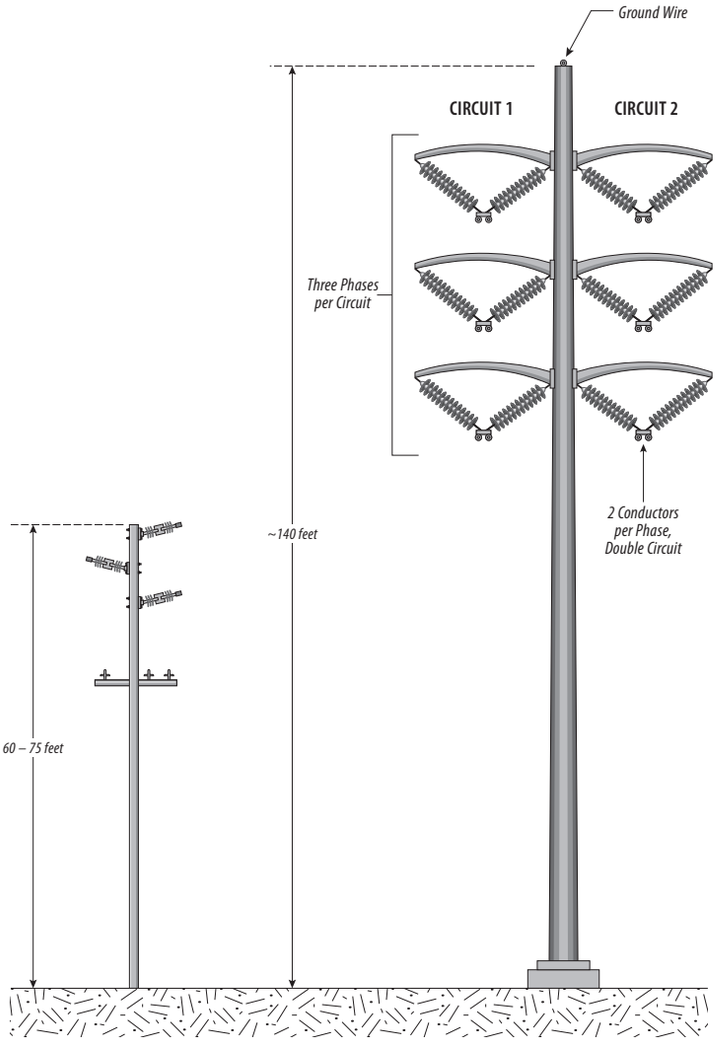
Conductors (i.e., "wires"), which conduct the electrical current, often consist of aluminum wires wrapped around a steel core for reinforcement. For public safety, conductors are connected to transmission structures typically via glass, porcelain, polymer, or silicon insulators to prevent transfer of the electrical current from the conductors to the structure.

Ground wires (also called "shield wires" or "earth wires") are placed along the tops of transmission structures to guard against lightning strikes. Ground wires may also contain a **fiber optic communication** line so that a signal can be directed to a nearby substation in the event of a problem along a portion of the line. The substation, using built-in mechanisms to detect problems along the line, can shut down sections of the line as necessary. In addition to being installed within ground wires, communication lines can be installed in separate locations.

Transmission lines contain circuits that consist of multiple conductors along which the electrical current flows. Transmission structures can be designed as single-circuit or double-circuit structures:

Single-circuit structures consist of 3 "phases." 3 phase circuit configuration can help reduce unwanted side-effects such as noise and radio interference. Each phase typically consists of only one conductor (i.e., "wire").

Double-circuit structures have two circuits per structure, each circuit also consisting of 3 phases. To increase the line's carrying capacity, each phase can consist of 2 or more bundled conductors.



Typical 69-kV Wood Pole (SIngle Circuit)

Typical Double-Circuit Tubular Steel Pole

For more information...

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