

How we get electricity – and how Tucson Electric Power restores it after an outage



H. Wilson Sundt Generating Station

Electricity can't be stored — it's created as demanded. Three desks make sure power gets to Tucson Electric Power commercial and residential customers.



GENERATION

"I make electricity!"

This desk monitors power usage — which ebbs and flows throughout the day — and controls how much electricity is generated to support that load.



TRANSMISSION

"I ship electricity!"

Controlling voltage and maintaining it across the wires are the primary responsibilities of this desk. Transmission also keeps tabs on substations.



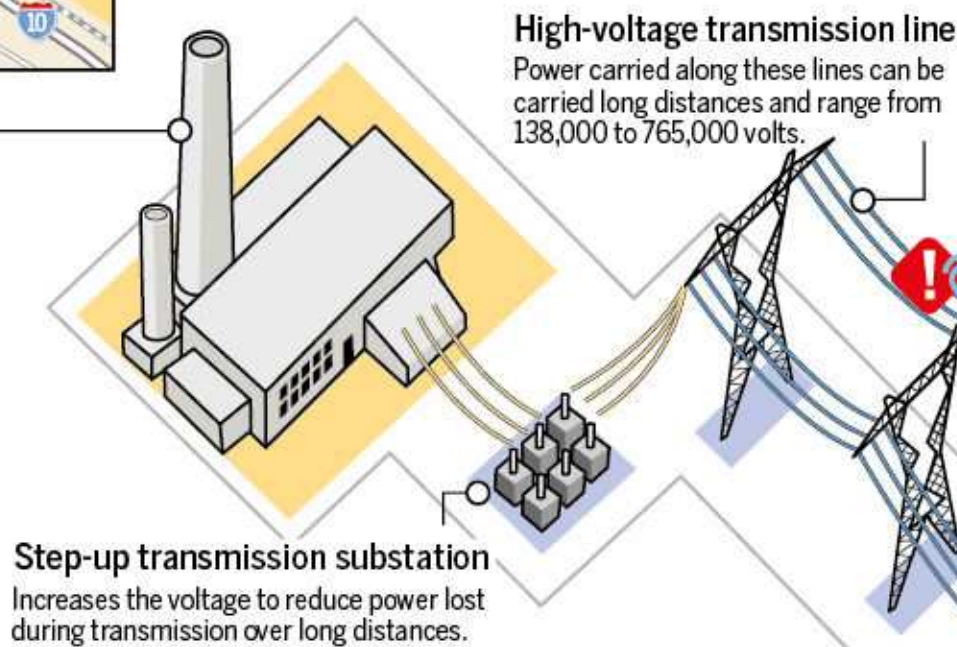
DISTRIBUTION

"I use electricity!"

This desk deals primarily with the end users of the power grid — residential customers. Has an extensive mapping tool to identify neighborhood power problems.

Generating station

Power is created at a plant using steam, which drives a generator that produces electricity. In Tucson, electricity is created at the H. Wilson Sundt Generating Station, which burns natural gas.



High-voltage transmission line
Power carried along these lines can be carried long distances and range from 138,000 to 765,000 volts.

Step-up transmission substation
Increases the voltage to reduce power lost during transmission over long distances.

PROBLEM: Wind tumbles a transmission tower

Fix: The transmission and distribution desks work together to find a way to isolate and reroute power from one point to another. Because of the grid-like layout of the system, alternate routes are easy to identify and "switch" to in the event of a major outage. Most customers will continue to receive electricity while the lines are replaced.

Step-down transmission substation

Sometimes called a "switching station," this area connects two transmission lines and switches voltage from higher to lower.



"Let's reroute power here."



"OK!"

PROBLEM: Lightning strikes a pole

Fix: Utility poles can be made of wood, steel, fiberglass or cement. If lightning hits and severely damages the pole, it must be taken down and replaced. A crew of several experienced technicians and an auger truck will be sent to the job site.



"That pole has to go."

Distribution substation

Transfers power from transmission lines to the local distribution system. Voltage is again reduced since these customers don't use large amounts of power.

A pole is down; now what?

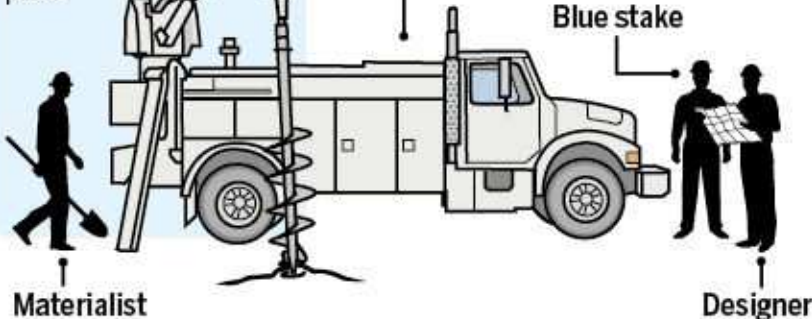
The distribution center will send the following crew members to the site of a downed utility pole:

Blue stake
Marks locations of underground power, water, gas and phone lines prior to digging at the job site.

Designer
Chooses type of replacement pole — typically steel.

Materialist
Picks all materials for the project and delivers them to the site.

Auger truck
Digs hole for the new pole.



Last stop — your home: Usually the lights turn on and off when you want. Sometimes they don't. What happens next? Here's how TEP locates an outage:



"Your lights are out. I'll get right on that!"

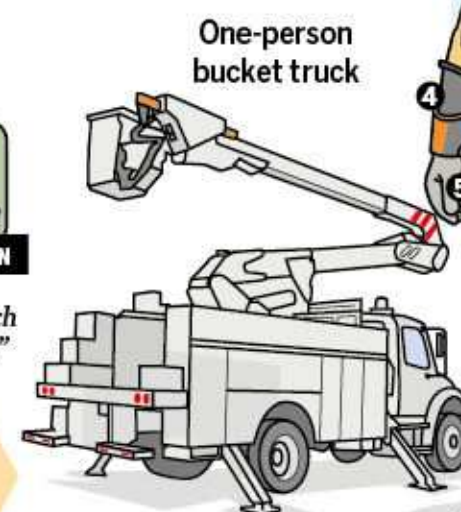
- A customer calls to report the outage. Calls to TEP's 24-hour power outage hotline — 623-7711 — are automatically registered in the distribution center.
- The outage is pinpointed. A computer with a GIS-mapping program places the reported outages on a map. View the outage map at TEP.com/outages.
- Repair crews are dispatched to the area. With safety always in mind, equipment and crews are sent to fix the problem.

PROBLEM: Balloon in the line

Fix: Tucson Electric Power has several line technicians, or troublemen, on duty at all times, especially during the monsoon season. These one-person crews, are sent out by the distribution desk to make minor repairs.



"I'll dispatch a lineman."



A lineman's tools

- 1 **Hard hat**
Tough plastic shell protects head from debris or electrical contact
- 2 **Safety glasses**
One-piece, nylon frame
- 3 **Climbing belt**
Supports technician's weight when climbing poles
- 4 **Glove protectors**
Made of leather and worn over rubber gloves to protect from puncture
- 5 **Rubber gloves**
Insulated so technician can repair lines without cutting out power
- 6 **Hot stick**
Insulated fiberglass tool that telescopes up to 30 feet to let the technician work from the ground
- 7 **Rubber sleeves**
Protect wearer's arms from electrical contact
- 8 **Overshoes**
Worn over boots to insulate feet from electrical current

