ENGINEERING
Eastern Plains
TRANSMISSION PROJECT

Electrical Characteristics

Electrical Safety

- Electric fields have the potential to cause nuisance electrical shocks, which are also called "stray current".
- Electric field levels at ground level will not exceed the limits of the National Electrical Safety Code.
- While many activities are compatible with transmission line rights of way, precautions must be taken near electrical equipment.

Corona

- Corona is the electrical breakdown of the air into charged particles near high-voltage conductors.
- Corona can cause audible noise as well as radio and television interference.
- Corona effects are more noticeable during wet conditions, such as a rainstorm.
- Corona effects are limited to the right of way and immediately adjacent areas.

Electric and Magnetic Fields

- All electrical equipment, including transmission lines and substations, produce electric and magnetic fields.
- Fields are highest closest to electrical equipment or devices and fall rapidly with distance.
- Many studies of EMF have been conducted but none has identified a mechanism where EMF can cause disease.

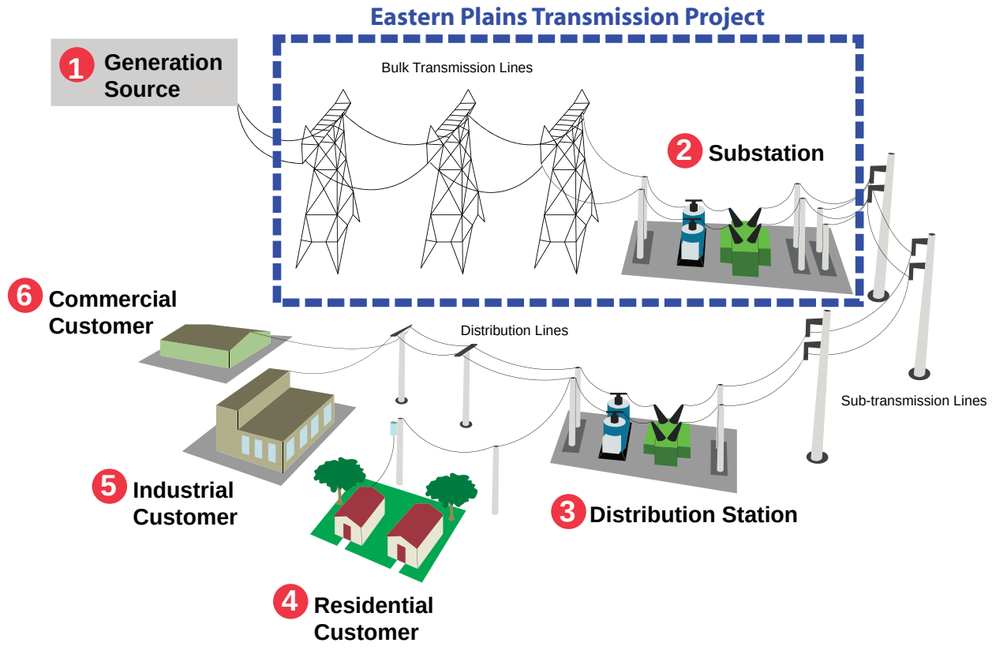
The Electric Transmission System

The electric power delivery system is divided into two components: transmission and distribution.

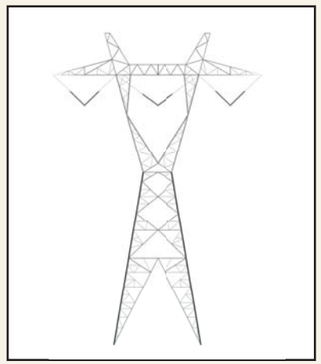
- The transmission system delivers electricity from place to place at high voltages. Typically, power transmission is between a power generator and a substation near a power user.
- The distribution system delivers lower voltage electricity from a substation to consumers.

The Eastern Plains Transmission Project is designed to move large amounts of power long distances at high voltages.

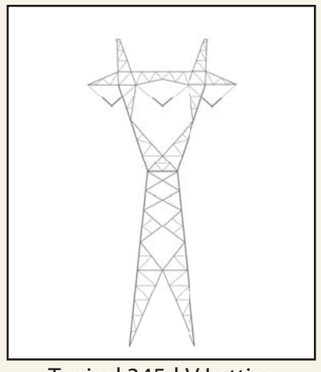
The EPTP is needed to ensure that Western Area Power Administration and Tri-State Generation and Transmission Association, Inc., can continue to provide reliable electric service to their customers and member systems.



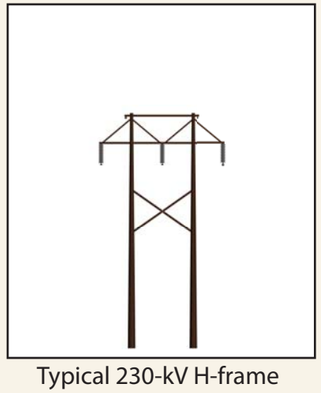
http://www.wapa.gov/transmission/eptp.htm



Typical 500-kV Lattice Structure



Typical 345-kV Lattice Structure



Typical 230-kV H-frame Structure

Project Components

The EPTP would consist of about 1,060 miles of new transmission line segments, new or expanded substation facilities, and a communication system.

Transmission Lines

- Eight segments (about 770 total miles) of 500-kilovolt transmission line using steel lattice structures
- Two segments (about 155 total miles) of 345-kV transmission line using steel lattice structures
- Five segments (about 135 total miles) of 230-kV transmission line using wood or steel H-frame structures
- The typical right of way would be 200 feet wide

Substations

- Construct four new substations
- Expand eight existing substations

Communication System

- Fiber optic cable integrated with one of the two static ground wires at the top of the structures.
- Ground level regeneration facilities a maximum of 50 miles apart and placed within the transmission line rights of way.

Design and Construction

The transmission lines would be designed to meet or exceed the minimum requirements of the National Electrical Safety Code.

Design activities in the right of way

- Surveying
- Geotechnical exploration (boring)
- Construction activities in the right of way
- Access construction
- Structure foundation construction
- Tower assembly and erection
- Conductor installation
- Cleanup
- Reclamation

Construction crews would access each property several times to complete a segment of the transmission line.

Total construction time at each structure would be about three weeks spread over several months.

Construction of the entire EPTP would take about three years and will be completed in phases.

Construction practices would be tailored to minimize effects to existing land uses.

Safeguards would include:

- Assigning inspectors to ensure environmental compliance by contractors
- Assigning right of way agents to communicate with landowners
- Restricting crews and equipment to specified right of way access
- Installing erosion control measures

Cleanup and reclamation activities would include:

- Removing all construction equipment and materials
- Repairing damage to property caused by construction
- Regrading and revegetating areas disturbed by construction

Landowners would be compensated for damage to landscaping or crops, loss of use for grazing, loss of production, or other property damage caused during construction.

Typical Design Characteristics

	500-kV	345-kV	230-kV
Structure Height (feet)	100-140	90-115	70-95
Structure Base (square feet)	625-2025	400-1225	400
Span Length (feet)	1200-1400	1000-1400	700-900
Structures per Mile (#)	4-5	4-5	7-10
Conductor Ground Clearance	Will meet or exceed NESC minimums		

Example Construction Photos