

Methodology for China Mainland Interprovincial Transmission Network (500 kV and 750 kV)

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Updated: September 2026

1. Overview

This methodology applies to the dataset covering China Mainland Interprovincial Transmission Network (500 kV and 750 kV) in Mainland China. The dataset contains curated records of AC transmission projects and describes the physical backbone of long-distance electricity transmission in China.

All information is drawn from publicly accessible sources and manually cross-checked across multiple sources.

2. Voltage Classification

AC transmission

- 500 kV — Extra-High Voltage AC (EHV AC)
- 750 kV — Extra-High Voltage AC (EHV AC)

The dataset includes only interprovincial lines and excludes lines located entirely within a single province-level jurisdiction.

3. Temporal Coverage and Transmission Project Status

- Project status: In operation, under construction, and approved
- Temporal cutoff: December 2025

Most approved and under-construction 500 kV projects are included, while coverage of such 750 kV projects is more limited.

4. Data Format

`cn_interprovincial_network_500kv_750kv`

The dataset is provided in CSV format. Each row represents an aggregated 500 kV or 750 kV connection between two provinces.

Field	Description
<code>province_a</code>	Province at one end of the connection
<code>province_b</code>	Province at the other end of the connection
<code>voltage</code>	Nominal voltage level
<code>capacity_mw</code>	Estimated transmission capacity (MW)
<code>circuits</code>	Number of circuits aggregated into the connection

5. Capacity

For AC lines, transmission capacity generally has no single definition because it depends on thermal limits, design parameters, and operating conditions. Assumed per-circuit capacity: 1,200 MW (500 kV) and 3,000 MW (750 kV).

6. Data Sources

The dataset is compiled and cross-checked against a wide range of publicly accessible sources, including but not limited to:

- Official statistical publications, including the *China Electric Power Statistical Yearbook*, *Annual Development Report of the Power Industry*, *electric power industry statistical compilations*, *National Power Reliability Annual Report*, *provincial electric power yearbooks*, *provincial statistical yearbooks*, and other reports
- Government and grid company websites, including central and provincial government agencies, state-owned asset supervision authorities, energy and development authorities, State Grid Corporation of China, China Southern Power Grid, and Inner Mongolia Power Group
- Satellite imagery
- Environmental impact assessment documents, project approvals, tender documents, and contract award notices
- News reports
- Public power-industry information platforms
- Industry media, such as BJX and relevant WeChat official accounts

[OpenStreetMap](#) (OSM) serves as an important data source for cross-validation. However, key attributes affecting transfer capacity (voltage level and number of circuits) are largely missing, and some gaps prevent direct usage (including fragmented line segments, ring-shaped (closed-loop) line geometries, and the coexistence of decommissioned and newly built lines). In addition, satellite imagery data is used for verification. The CSV file does not contain third-party

imagery, screenshots, coordinates, or detailed spatial geometries. We carefully screen data sources before adopting for cross-validation.

7. Aggregation of the Interprovincial Network

The public interprovincial network CSV is derived by aggregating the line-level working data. For each province-to-province pair, all lines connecting the two provinces are aggregated into a single equivalent line.

The aggregated data do not retain the coordinates, detailed geometries, tower locations, or precise substation locations of individual lines. Transfer capacity and transmission loss values are estimates prepared for academic use.

8. Uncertainty and Limitations

Although the data have been manually validated across multiple sources, minor omissions, reporting lags, duplicate records, or inconsistencies may remain because sources differ in publication date, project naming, and reporting conventions.

This dataset is a simplified network model prepared for academic research. It is not a complete engineering database or a real-time grid dispatch dataset and should not be used for system operations, engineering design, construction, navigation, facility location, security assessment, or any other purpose requiring precise spatial or real-time operating information.