

Methodology for China Guangdong Inter-prefecture Transmission Network (500 kV)

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1. Overview

This dataset contains 500 kV AC transmission lines within Guangdong Province that connect 21 different prefecture-level cities.

All lines included are in operation or under construction and form part of Guangdong’s internal high-voltage transmission network.

The dataset is intended for academic research, policy analysis, and industry studies, such as regional power flow analysis and grid structure assessment.

2. Scope

- **Province:** Guangdong
- **Voltage level:** 500 kV
- **Transmission type:** AC
- **Geographic scope:** Intra-provincial, inter-prefecture connections
- **Status:** In operation and under construction
- **Temporal cutoff:** November 2025

Lines fully within a single prefecture are not included.

3. Data Format

The dataset is provided in CSV format. Each row represents an aggregated 500 kV connection between two prefecture-level cities.

Field	Description
<code>province</code>	Province name (Guangdong)
<code>prefecture_a</code>	The prefecture-level city at one end of the connection
<code>prefecture_b</code>	The prefecture-level city at the other end of the connection
<code>voltage</code>	Voltage level (500 kV)

Field	Description
<code>capacity_mw</code>	Aggregate transmission capacity (MW)
<code>circuits</code>	Number of 500 kV circuits

4. Field Notes

- `prefecture_a` / `prefecture_b`: The two prefecture-level cities connected by one or more 500 kV lines (e.g., Dongguan and Guangzhou).
- `capacity_mw`: Represents the total capacity of all 500 kV circuits connecting the city pair, calculated assuming a capacity of 1,200 MW per 500 kV circuit. Actual transfer capability may vary.
- `circuits`: Total number of 500 kV circuits between the two cities.

5. Data Sources

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

- Official grid company information, including China Southern Power Grid
- Power-sector reports
- Statistical publications, including *provincial electric power yearbooks*
- Satellite imagery

[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.

6. Limitations

Capacity values are estimated and may differ from real-time operational limits.