

Methodology for China Mainland EHV and UHV Transmission Lines

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1. Overview

This methodology applies to the dataset covering extra-high-voltage (EHV) and ultra-high-voltage (UHV) transmission networks in Mainland China. The dataset contains curated records of AC and DC 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

The dataset uses the voltage categories commonly applied in China's power system.

DC transmission

- ± 400 kV — Extra-High Voltage DC (EHV DC)
- ± 500 kV — Extra-High Voltage DC (EHV DC)
- ± 660 kV — Extra-High Voltage DC (EHV DC)
- ± 800 kV — Ultra-High Voltage DC (UHV DC)
- ± 1100 kV — Ultra-High Voltage DC (UHV DC)

AC transmission

- 1000 kV — Ultra-High Voltage AC (UHV AC)

Both interprovincial/interregional and intraprovincial lines are included for all DC and 1000 kV AC projects.

3. Temporal Coverage and Transmission Project Status

- **Project status:** In operation
- **Temporal cutoff:** December 2025

4. Data Format

cn_ehv_uhv_dc_uhv_ac_lines

The dataset is provided in CSV format. Each row represents a provincial-level EHV AC, UHV DC, or UHV AC transmission line, including both interprovincial and intraprovincial lines.

Field	Description
<code>line_type</code>	Transmission technology (DC or AC)
<code>voltage</code>	Nominal voltage level (e.g., ± 800 kV or 1000 kV)
<code>name</code>	English name
<code>name_local</code>	Chinese name
<code>name_full</code>	Full official English name, if available, or an English translation
<code>name_full_local</code>	Full official Chinese project name
<code>commissioning_date</code>	Date of commissioning (MM-DD-YYYY)
<code>rated_capacity_mw</code>	Rated transmission capacity, where available
<code>rated_capacity_source</code>	Source for the rated transmission capacity
<code>length_km</code>	Line length in kilometers, where available
<code>province_a</code>	Province at one end of the line
<code>province_b</code>	Province at the other end of the line

5. Interpretation of Province Fields

AC transmission

Province fields correspond to the locations of intermediate substations along the transmission corridor and are ordered according to the physical route of the line.

Two-terminal DC systems

- `province_a`: sending-end province
- `province_b`: receiving-end province

Three-terminal DC systems

Province fields reflect the actual terminal configuration of each project and may include multiple

sending or receiving provinces. This dataset includes the following three-terminal DC line.

- **Kunliulong UHVDC** 昆柳龙直流: Kunbei (Yunnan) – Liubei (Guangxi) – Longmen (Guangdong) ± 800 kV UHVDC Project
- **The Luquan – Gaopo – Zhaoqing HVDC** 禄高肇直流: Luquan (Yunnan) – Gaopo (Guizhou) – Zhaoqing (Guangdong) three-terminal HVDC project. It is a three-terminal system, but its two terminal-to-terminal sections are recorded as separate entries.
- **Jinshang – Hubei ± 800 kV UHVDC Project** 金永直流 Sending ends are located at the Kanggan converter station in Sichuan and the Changdu (Qamdo) converter station in Tibet.

Intraprovincial lines

For intraprovincial lines, `province_a` and `province_b` contain the same province name.

6. Capacity

- DC lines: following officially published rated capacities.
- AC lines: transmission capacity generally has no single definition because it depends on thermal limits, design parameters, and operating conditions. Capacity values are provided only where reliable public information or a consistent estimation method is available.
- Line length is provided when an authoritative source is available; otherwise, the field is left blank.

7. 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

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.