**Pakistani Transmission grid**

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**Definitions of sheets and column names**

File Pakistan transmission grid data contains Five sheet.

1. **Nodes**

This sheet contains 10 columns:

Column A (nid) contains index of the substations (some of the them are removed because they have same OSM id).

Column B (osm\_id) contains open street map id of the substations.

Column C (name) contains the name of the power plants.

Column D (type) contains type of the osm\_id.

Column E (lat) contains latitude of the corresponding osm\_id.

Column F (lon) contains the longitude of the corresponding osm\_id.

Column G (nominal\_power\_output) contains the nominal power of the power plant in units MW.

Column H (population) contains the sum of the population of the surrounding cities.

Column I (fraction\_of\_population) contains fraction of total population.

Column J (fraction\_of\_total\_consumed\_power) contains fraction of the total consumed power in units Wh,

1. **Links**

This sheet contains 8 column

Column A (lid) contains index of links

Column B (osm\_id) contains OSM\_id of the links

Column C (nid1) contains index of nodes 1

Column D (nid2) contains index of the node 2

Column E (voltage) contains voltage of transmission line.

Column F (cables) contains number of the cables

Column G (wires) contains number of wires.

Column H (length\_direct) contains direct length of the transmission connecting two nodes

1. **Cities population and location**

This sheet contains 8 columns:

Column A (cid) contains index of cities

Column B (name) contains names of the cities.

Column C (population) contains the population of the cities.

Column D (province) contains province in which the corresponding cities are.

Column E (lat) contains the latitude of the cities.

Column F (lon) contains the longitude of the cities.

Column G (closest\_distance) contains closest distance of the cities to the nearest substation in unit meter (m).

Column H (Closest\_substation\_index) contains indexes of the closest nodes to the corresponding cities.

1. **Industries**

This sheet contains 4 columns: column A (s.no) contains index of the industries, column B (industries) contains the name of the industries, column C contains (cities) contains names of the corresponding cities, column D (closest\_substation\_index) contains index of the closest substation to the industries.

1. **State population**

This sheet contains 3 columns.

Column A (sid) contain the index of the state/province/division.

Column B (division) contains names of the states.

Column C (population) contains the population of the states of Pakistan

**Sources**

1. [**https://www.openstreetmap.org**](https://www.openstreetmap.org)

Open street map ids were taken from Open street maps.

1. [**http://www.flosm.de/en/Power-Grid.html**](http://www.flosm.de/en/Power-Grid.html)

Information about links was taken from Flosm by seeing which link is connected to which link

1. [**http://www.scribd.com/doc/12487960/List-of-100-Companies-of-Pakistan#scribd**](http://www.scribd.com/doc/12487960/List-of-100-Companies-of-Pakistan#scribd)

List of the companies were taken from this website

1. [**http://www.citypopulation.de/Pakistan-20T.html**](http://www.citypopulation.de/Pakistan-20T.html)

Cities population were taken from this website

1. [**https://www.google.com/maps/**](https://www.google.com/maps/)

Google map was used to take geographical position of the nodes and cities. Missing data on open street map was completed by using google maps.