9.16 - Retrieval of Data as JSON Files

- site used for geo data retrieval: overpass turbo (overpass-turbo.eu)

Transmission Lines

- code used for retrieval:
  - `relations` are =0 so that line is useless

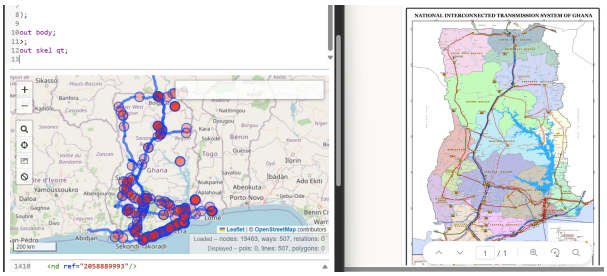
```
area[name="Ghana"]->.a;
(node[power=line](area.a);
  way[power=cable](area.a);
  way[power=line](area.a);
  way[power=minor_line](area.a);
 relation[power=line](area.a);

);

out body;
>;
out skel qt;
```

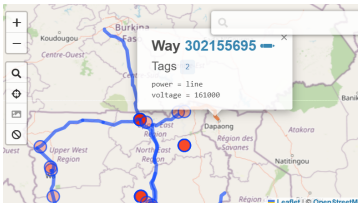
Finding/Verifying Consistencies in **JSON file** and **National Interconnected Transmission System of Ghana** image provided in Teams:

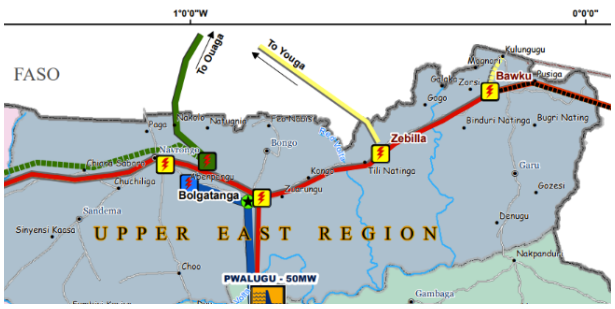
- Overpass Turbo data retrieval JSON file appears to contain most/all *existing* transmission lines in the National Interconnected Transmission System image
  - proposed transmission lines not present in JSON file

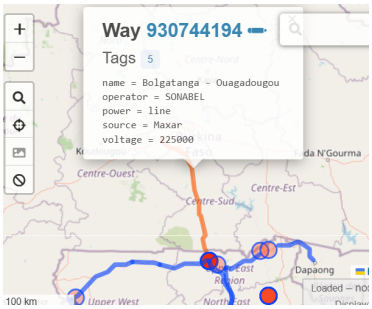


filename: `export_T_line.geojson`

- Some lines appear slightly different, at least in geographic layout







Generators

- code used for retrieval:

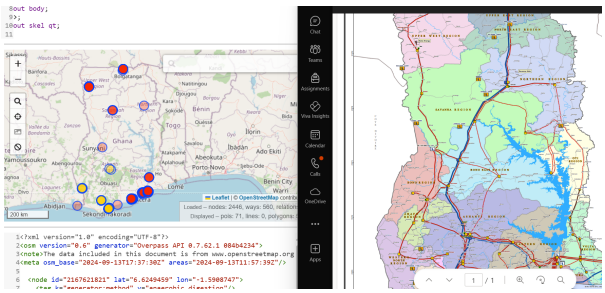
```
area[name="Ghana"]->.a;
(node["power"="generator"](area.a);
  way["power"="generator"](area.a);
 relation["power"="generator"](area.a);

);

out body;
>;
out skel qt;
```

Finding/Verifying Consistencies in **JSON file** and **National Interconnected Transmission System of Ghana** image provided in Teams:

- appears? some Hydro sources, and possibly other generators, not present in JSON file.
- *should modify code to specify different generator sources, including maybe hydro/solar/etc? or searching for substations?*
- *How should I modify this search? should I search for substations as well?*



filename: `export_generators.geojson`

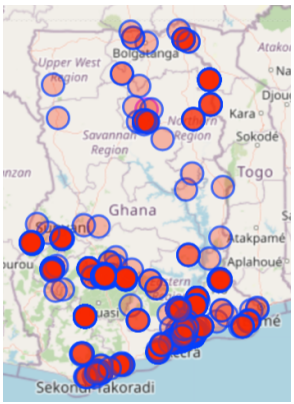
Load/Demand

- finds geographic locations most likely correlated with areas of high population. *may be unable to obtain direct population data or electricity demand data, but can pinpoint areas of possible high population and demand for future research.*

- finding/estimating load and demand was done by:
  - looking into industrial (`way["landuse"="industrial"]`), commercial areas (`way["landuse"="commercial"]`), shops (`shop=*`), factories (`man_made=works`)
    - *update: this failed because too many data points.* `landuse` *is probably a very vague/general tag*
  - looking into high-rise buildings (`buildings=apartments`, `building=office`, `way["building"~"apartments|office"]`)
  - ✅search for substations as well? (`node["power"="substation"]`) *(done as a separate query & saved as a separate JSON file)*
  - ✅areas of high population / density *(done as a separate query & saved as a separate JSON file)*
    - can't be done directly, but can search for specific tags generally correlated with higher population density (residential areas, apartment buildings, high-rise buildings, terraced houses, schools, hospitals, etc)

- code used for retrieval: *(areas of high population / density)*
  - *offices, factories, apartments*

```
area[name="Ghana"]->.a;
(
  way["building"="office"](area.a);
  relation["building"="office"](area.a);
  way["building"="apartments"](area.a);
  relation["building"="apartments"](area.a);
  way["building"="terrace"](area.a);
  relation["building"="terrace"](area.a);
  way["building"="industrial"](area.a);
  relation["building"="industrial"](area.a);
);
out body;
>;
out skel qt;
```



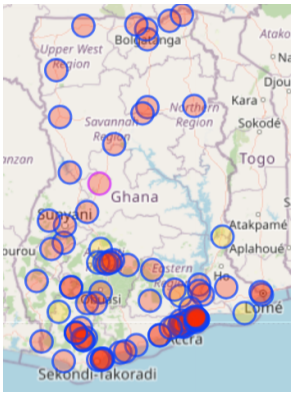
filename:
`export_office_apts_terrace_`

- code used for retrieval: *(areas with substations)*

```
area[name="Ghana"]->.a;
(node["power"="substation"](area.a);
  way["power"="substation"](area.a);
 relation["power"="substation"](area.a);

);

out body;
>;
out skel qt;
```



filename:

`export_substations.geojson`