



OnSSET/Global Electrification Platform

Hands-on 4: Data collection and database development
for GIS¹

Learning outcomes

By the end of this exercise, you will be able to:

- 1) Download GIS data which are open source for your project

Data collection

In order to conduct the geospatial electrification analysis using the GEP Scenario Generator – OnSSET – up to 17 datasets are required (see table below).

| # | Dataset | Data type |
|---|--|-----------|
| 1 | Administrative boundaries | Polygon |
| 2 | Hydro points | Points |
| 3 | Power substations | Points |
| 4 | Service transformers | Points |
| 5 | Medium-voltage lines (Existing) | Lines |
| 6 | Medium-voltage lines (Planned) | Lines |

¹ This exercise is an exercise developed by Sahlberg, A., 2019 Exercise 4: Data collection and database development for GIS [WWW Document]. OnSSET Teaching Kit. URL https://onsset.github.io/teaching_kit/courses/module_2/Excercise%204/ (accessed 2.18.21).



| | | |
|----|--------------------------------------|--------|
| 7 | High-voltage lines (Existing) | Lines |
| 8 | High-voltage lines (Planned) | Lines |
| 9 | Roads | Lines |
| 10 | Population | Raster |
| 11 | Global Horizontal Irradiation | Raster |
| 12 | Wind velocity | Raster |
| 13 | Elevation | Raster |
| 14 | Land cover | Raster |
| 15 | Travel hours | Raster |
| 16 | Night-time lights | Raster |
| 17 | Custom demand layer | Raster |

Note: The only vector dataset that is strictly required is the administrative boundaries. The analysis can be run without the remaining vector datasets, but the model performs better if more datasets are available. If, for example, the high-voltage and medium-voltage lines are not included in the data, the model will present as though this infrastructure does not exist in the country.

For this exercise, we have prepared most of these datasets for you. You are required to collect three of these datasets on your own: **Global Horizontal Irradiation**, **Wind velocity**, and **Administrative boundaries**. Use the three first sources below to collect the datasets required for this exercise. Collect these datasets for Benin.



Global Solar Atlas

The Global Solar Atlas is an online platform developed by SolarGIS with funding from ESMAP. On this platform you will be able to find many GIS datasets related to solar resources in your country. In the GEP Scenario Generator – OnSSET – two of the technologies that are used are Stand-alone PV modules and Mini-grid PV systems. When determining the suitability of PV-panels the global horizontal irradiation (GHI) is of high importance. The Global Solar Atlas has near global coverage (except for around the poles), hence you will be able to use this webpage to download your GHI raster. Go to download and choose the LTAYm_YearlyMonthlyTotals in the data format GEOTIFF.

Source: <https://globalsolaratlas.info/>

Global Wind Atlas

The Global Wind Atlas is an online platform developed by the Technological University of Denmark with funding from ESMAP. On this platform you will be able to find many GIS datasets related to wind resources. In the GEP Scenario Generator – OnSSET – the suitability of wind turbines is assessed taking into account the wind speed at every location. Similar to the Global Solar Atlas, the Global Wind Atlas has global coverage. Use this source in order to download your wind speed raster. Select Download on the website, go to “GIS files and API access” and choose the following: Benin, wind-Speed, and height 50 m.

Source: <https://globalwindatlas.info/>

GADM

The GADM database contains the administrative boundaries for most countries on both a national and sub-national level. The data is freely available for academic and non-commercial use. Download the Shapefile package for Benin.

Source: <https://gadm.org/data.html>