Energy Access Explorer - Front End Tutorial

I. Learning outcomes

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

1) Familiarize with Energy Access Explorer (EAE) data, functions, and analysis features.

2) Explore and conduct custom multi-criteria decision analysis scenarios in EAE to identify high-priority areas for energy interventions.

3) Validate and communicate EAE results, listing key data, and parameters affecting the scenarios.

II. Energy Access Explorer: A Digital Public Good to Deliver Climate-friendly and Viable Energy Transitions for All

Energy Access Explorer (EAE) is the **first, open-source, online and interactive geospatial platform** that enables **energy planners, clean energy entrepreneurs, donors, and development institutions** to identify **high-priority areas for energy access interventions**. EAE functions also as a dynamic information system, reducing software engineering and data transaction costs for both data providers and users and facilitating **data management and governance**.

In this tutorial we will be utilizing EAE through a practical hands-on exercise to identify high-priority areas for energy interventions.

Open Energy Access Explorer at: energyaccessexplorer.org

Select **Tool** then select "**Uganda**" or any other country from the geographies listed.
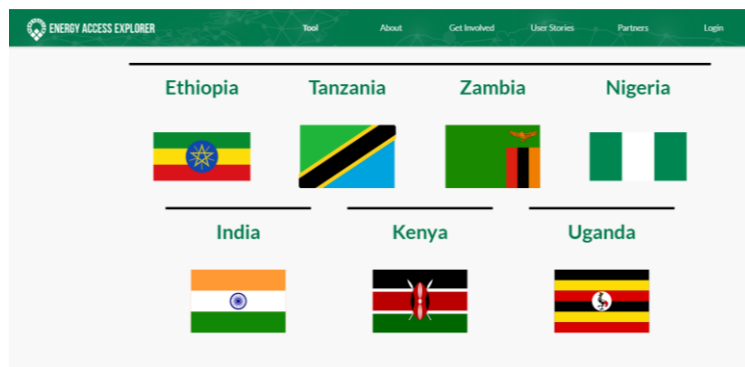
In the pop up that appears of '*Choose your area of interest*', select **'Generate custom analysis based on your own criteria'** then close the 'Welcome to Energy Access Explorer' pop up.

On the tools panel in the left, select the first tool ☰ to display the data panel.

You can see the EAE interface for Uganda/your selected country where the panel on the left shows the various categories of datasets for both demand, supply and other that can be selected and loaded to map window in the middle for visualizations and analysis.

III. Sample Analysis Scenario

Strategic energy planning: *Suppose you are an analyst at an energy agency and would like to indicate high priority areas where access to energy could be expanded by extending the grid network*

or possibly setting up off grid options with priority given to areas close to health care facilities for health care electrification program.

Datasets required for analysis:

❖ *Energy Demand: Population density, Productive Uses: Healthcare Facilities*
❖ *Energy Supply: Distribution lines, Global Horizontal Irradiation*

Step 1: Load energy demand side datasets and set filters

Select **Demand** category on the data panel *(towards top left of display).*
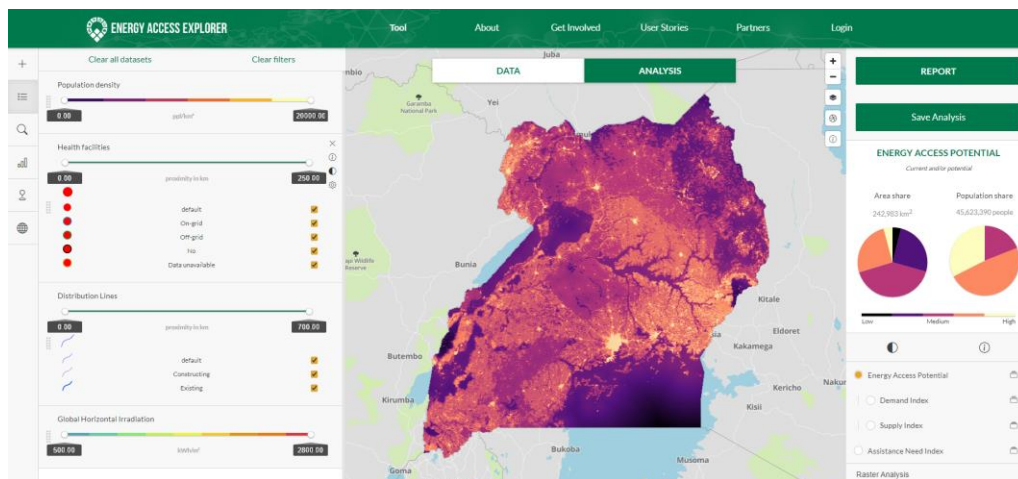
Add **Population density** layer *(Demographics).*

Add **Healthcare Facilities** *(Productive Uses).*

Step 2: Load energy supply datasets and set filters

Select **Supply** category on the data panel.

Add **Distribution lines** layer *(Infrastructure).*

Step 3: Switch from **"Data"** to **"Analysis"** view to explore the analytical outputs/high priority areas.

Step 4: In the *Active layers* panel, under the Healthcare Facilities layer enter **maximum value: 10** to filter the areas on the map that are within 10km from the closest health care facility.

Still in the *Active layers* panel, under the Distribution lines layer enter **minimum value: 2** to filter the areas on the map that are further than 2km away from the distribution lines.

The areas now remaining are possibly not grid connected due to their distance from the closest distribution line (at least 2km away) and are in areas close to a potential social & productive use of energy (healthcare facilities).

In the *Data panel* on supply, add **Global Horizontal Irradiation** *(Resources).*

In the Active layers panel under **Global Horizontal Irradiation.** Enter **min: 1800** to filter the areas on the map that receive at least 1800 kWh/m^2 of solar irradiation illustrating high solar potential.

Step 5: Interpret the analysis results

The map shows areas that meet the criteria for this analysis i.e, are close to productive uses of energy (healthcare facilities), far from the electricity distribution lines and have great potential for solar energy.

The panel on the right displays various statistics regarding the priority areas through the Energy Access Potential Index. This index ranges from low to medium to high. Brighter colors demonstrate high potential, while areas with lower potential tending towards darker colors.
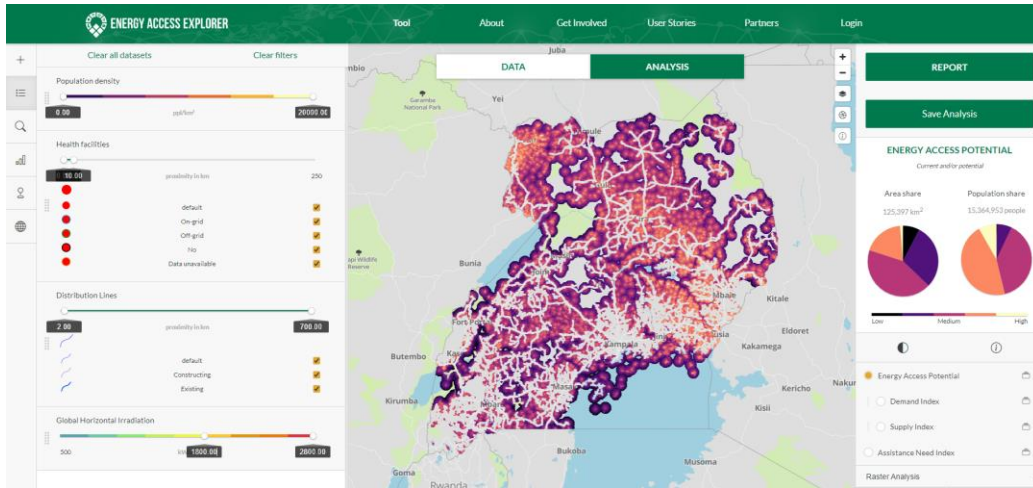

In addition, the total area and population share of areas that meet these criteria are also given.

Step 6: On the left panel, you can click the **'Top locations'** button to get a list of the top 20 priority locations that meet your unique criteria. Click any of the points and the map will zoom to that location.

Use the **identify** button on the map display to click on the zoomed location to understand why this particular location is considered a high priority one.

Step 7: Change geography *in the geography icon* *on the tools panel. You can search for the subnational administrative division you are working in by typing the name into the search window. Your analysis will then be updated on the fly to subnational geography of choice.*
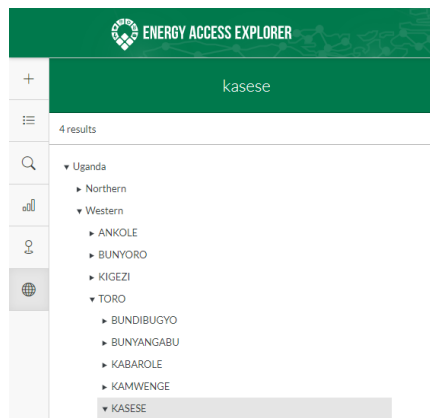
Step 8: Change your basemap from "**Light**" to "**Satellite**" to get a better sense of the situation on the ground.

Now use the transparency slider button ◑ to adjust opacity of the results to about 30% (at least a third). You can find the opacity slider on the right panel under the summary graphs for total area and population share.
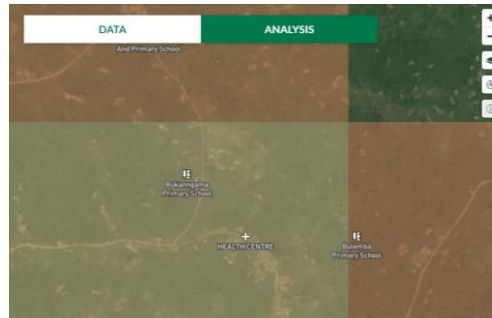
Finally, you can export the report of this analysis by clicking on Snapshot (bottom of the results panel on the right) and go through the summary graphs, visualize the summary table and export, and review the pdf and csv reports.

IV. Group Activity – Case Scenarios

In your respective groups, choose any of the scenarios below and proceed to discuss as a group on how to implement it then attempt the scenario and answer the questions at the end of the manual.

Case Scenarios

On a browser, open Energy Access Explorer using this link:
https://www.energyaccessexplorer.org/tool/s/

Select **Uganda** from the geographies listed. On the tools panel in the left, select the first tool ☰ to display the data panel.

Scenario 1 – Strategic integrated energy planning

Suppose you are an analyst at an energy agency and would like to indicate high priority areas where access to energy could be expanded by extending the grid network or possibly setting up off grid options with priority given to areas close to productive uses of energy with high solar potential.

Task: Create a multicriteria analysis combining at least 5 datasets from demand, supply and other to indicate high priority areas where the grid should be expanded.

Hint: You could begin by locating areas close to schools and health care facilities, not connected to the grid but where grid coverage is close enough to extend it

Scenario 2 - Expansion of clean energy markets

Suppose you are an analyst in a clean energy enterprise searching to expand clean energy markets by identifying where potential customers may be located and validating collected data.

Task: Create a multicriteria analysis combining at least 5 datasets from demand, supply and other to indicate high priority areas where the markets should be expanded.

Hint: Areas with good solar potential far away from grid, close to social and productive use of energy, *and enough population. You can also consider the ability to pay through relative wealth index.*

Scenario 3 – Prioritization of energy access investments (Donors and Development Finance Institutions)

Suppose you are an analyst in a development finance institution interested in identifying areas where assistance is most needed & investment could have a greater impact.

Task: Create a multicriteria analysis combining at least 5 datasets from demand, supply and other to indicate high priority areas where investments could have the greatest impact.

Hint: High energy demand for social and productive use, low economic activity/ability to pay, and low access to grid infrastructure and resources. You can also use the Assistance need index.

Scenario 4 - Service delivery institutions in the health sector

Suppose you work in a government agency supporting an off-grid electrification program for the health sector. You are interested in identifying areas with potential energy needs associated to health care but too far for grid extension.

Task: Create a multicriteria analysis combining at least 5 datasets from demand, supply and other to indicate high priority areas for this off-grid electrification program.

V. Guiding Questions

1. In the Analysis view of the EAE, are there any areas that appear with a high energy access potential (lightest color)? Choose one of these areas and explain why this could be high. *(Hint: switch from data to analysis view in the map window)*.
2. What is the total population in this area with high energy access potential. *(**Hint**: use identify tool).*
3. What are the top 3 locations that meet these criteria? Select the first location to view where it is located on the map *(Hint: use top locations tool on the left panel)*.
4. According to your criteria, what are the districts with high energy access potential? *(Hint: In the bottom right of the analysis view switch from Raster analysis to Administrative priority - District)*.