Planning Sustainable Energy Access in Tanzania: Using Energy Access Explorer

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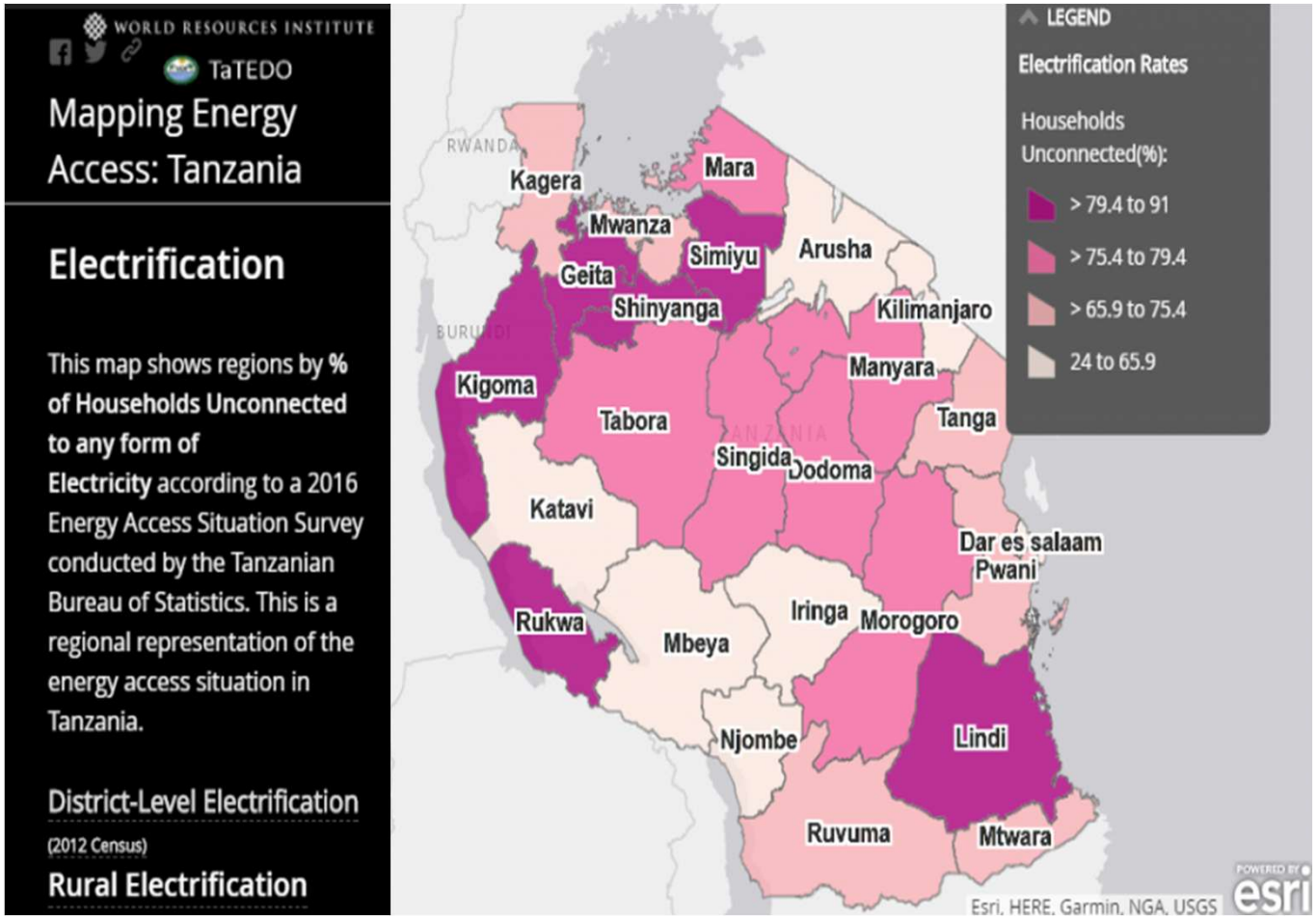
CONTEXT: COUNTRY ELECTRIFICATION STATUS

- Over 89 percent of households in mainland Tanzania still rely on traditional fuels and technologies for cooking, while in Zanzibar, the figure exceeds 84 percent.
- The government of Tanzania aims to increase electricity connectivity to 75 percent by 2030 and clean cooking access to 80 percent by 2034.
- It also aims to increase the share of renewable energy in the generation mix to 75 percent from the current 61.8 percent, which will require adding over 1,800 MW of generation capacity from solar, wind, geothermal, and hydro.



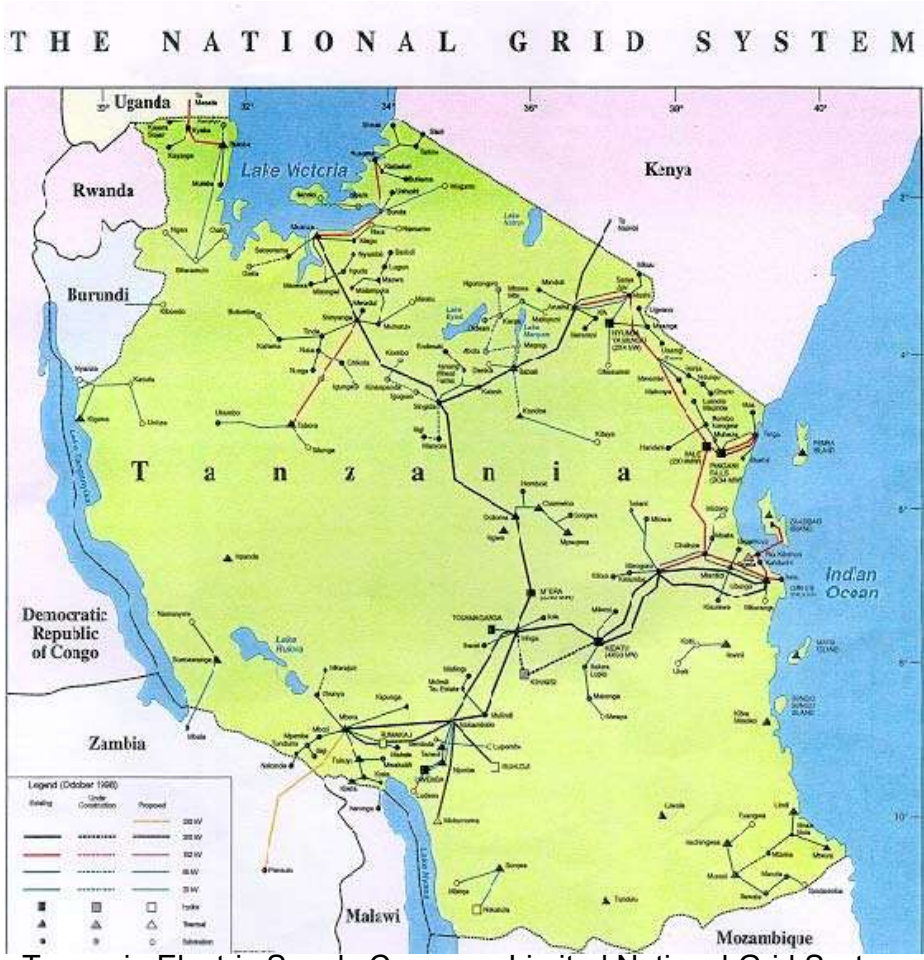
Source: Tanzania Traditional Energy Development Organisation 2016

RESEARCH QUESTION, CHALLENGE, AND FINDINGS

- **Research Question**: How can the Energy Access Explorer platform be used to support data-driven, inclusive, and spatially targeted sustainable energy planning?

- **Challenge:** Some regions exhibit strong solar irradiance and low electrification rates, making them ideal for solar mini-grids and solar home systems. In remote areas, extending the national grid may be cost-prohibitive.

- **Finding:** The expansion of sustainable and data-driven energy access in Tanzania through the application of the Energy Access Explorer enhances the ability of stakeholders to plan, prioritize, and implement renewable energy solutions effectively.



Source: Tanzania Electric Supply Company Limited National Grid System

METHODOLOGY

Priority areas for crops – Agriculture Analysis

DEMAND	SUPPLY
Crops Min 100km Max 26000km	Global Horizontal Irradiation Min 500km Max 2800km
Population Density Min 0km Max 100000km	Distribution Lines Min 0km Max 700km

Off-grid solar potential for social institutions like healthcare facilities and schools

DEMAND	SUPPLY
Healthcare Facilities Min 0km Max 5km	Global Horizontal Irradiation Min 1000km Max 2800km
Population Density Min 0km Max 100000km	Distribution Lines Min 2km Max 700km
Schools Min 0km Max 5km	

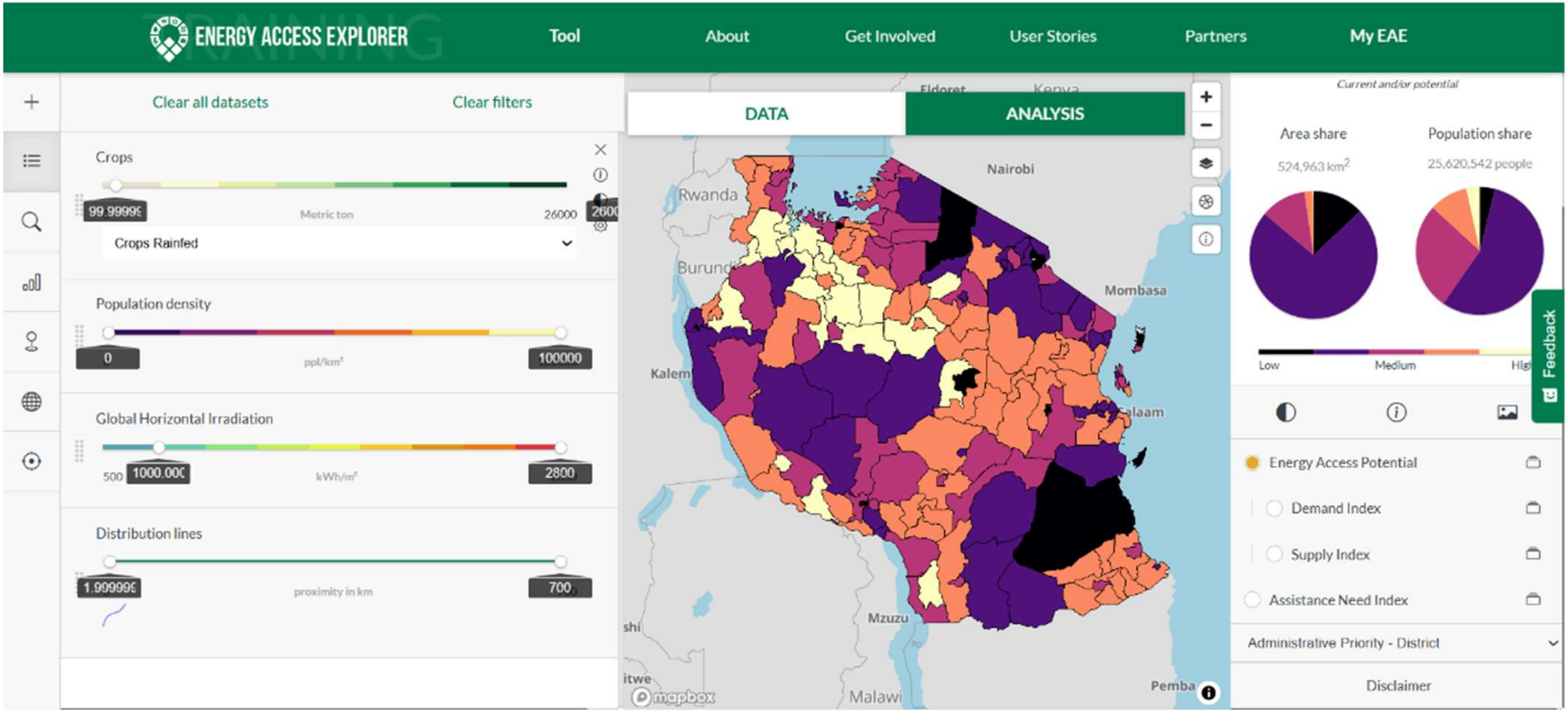
Improved Cookstove Expansion – Biomass Use and Adoption

DEMAND	SUPPLY
Relative Wealth Index Min 2km Max 2km	Biomass Min 20000km Max 60000km
Population Density Min 0km Max 100000km	

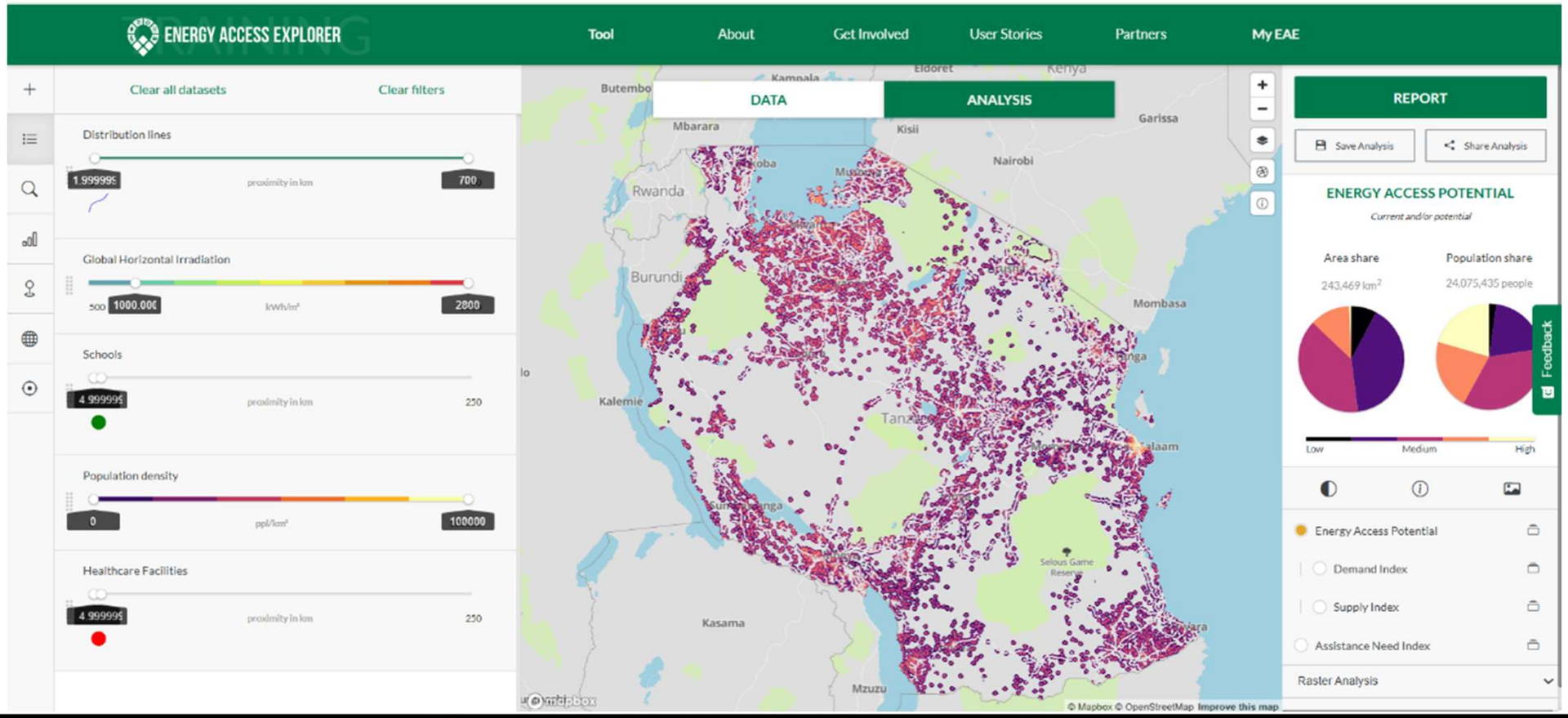
SCENARIOS AND RESULTS

Scenario Label	Scenario Description	Key Assumptions
Agriculture Analysis	Identify crop-oriented regions where access to electricity can unlock economic development through the productive use of Agricultural activities.	Areas in Dodoma and Morogoro show high potential for solar-powered irrigation, agro-processing, and rural entrepreneurship.
Electrification of Social Institutions	Identify unelectrified healthcare facilities and schools that are priorities for decentralized energy solutions	Many critical healthcare facilities are far from the grid and can benefit from solar PV systems. Areas in the Southern Highlands of Tanzania can be prioritized for renewable energy solutions
Expansion of Improved Cookstove Biomass Use and Adoption	While electricity access planning is essential, over 70% of Tanzanians rely on biomass (charcoal and firewood) for cooking. The transition to improved cookstoves (ICS) presents a cost-effective solution to reduce health risks, deforestation, and time poverty, especially for women and children.	Urban and peri-urban areas have growing charcoal demand; rural areas rely heavily on firewood. Areas with limited access to clean fuels but good road networks are ideal for ICS market development, such as Arusha, Mwanza, and Kilimanjaro.

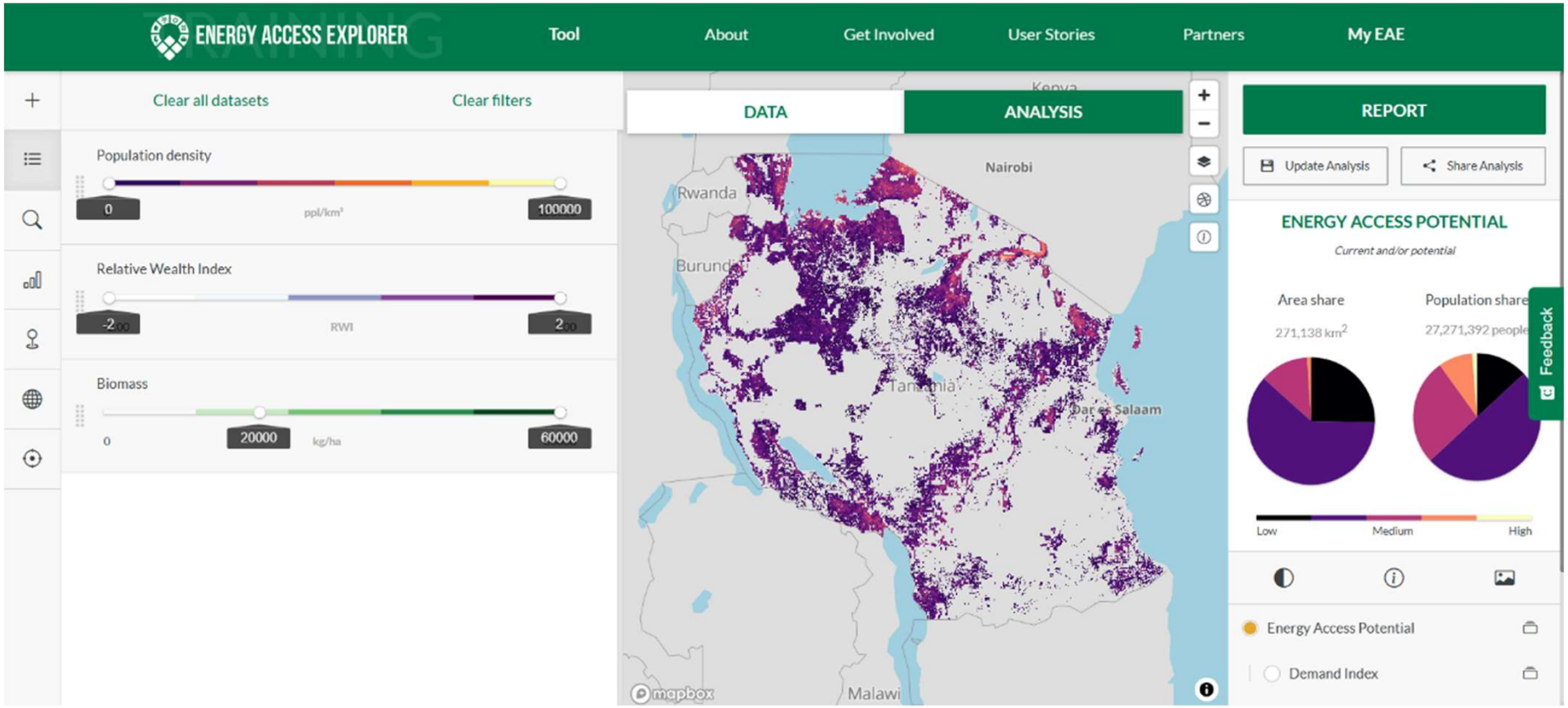
Agriculture Analysis – crop oriented areas: High Priority Locations for the Energy Interventions are Morogoro, Dodoma, Geita, and Tarime, whereby the Demand index info is high and the Supply Index info is Medium



Electrification of Social Institutions (healthcare facilities and schools): High Priority Locations for the Energy Interventions are Dar es Salaam, Lindi, Masasi, and Geita, where the Demand index info is high and the Supply Index info is Medium



Expansion of Improved Cookstove Biomass Use and Adoption: High Priority Locations for the Energy Interventions are Arusha, Mwanza, Kilimanjaro and Mara, where the Demand index info is high and the Supply Index info is High



CONCLUSIONS, RECOMMENDATIONS AND POLICY INSIGHTS

Conclusion

- Data-driven planning enhances impact
- Decentralized Renewable Energy Solutions are key for remote areas
- Scenario building is a powerful policy tool to align energy planning with diverse objectives, such as climate resilience, education, or rural development.

Recommendation

- Energy access must include a diverse range of social services infrastructure
- Clean cooking solutions require a dedicated focus on energy planning

Future Work

- The Energy Access Explorer platform can significantly improve transparency, equity, and effectiveness in Tanzania's energy sector through capacity-building trainings and stakeholder engagement, particularly as the country seeks to implement its National Clean Cooking Strategy 2024-2034, National Energy Efficiency Strategy 2024-2034, and Compact300 Action Plan.

TAREA STRATEGY 2023-27

For a sustainable Future

TAREA

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THANKS FOR LISTENING