Challenge

The existing lack of information and data on potential energy resources, infrastructure, projects, and technical know-how is hindering countless activities, particularly developments in the energy sector in Western Africa. This is due to poor-quality data on energy systems, potentials and trends, lack of standards, and a low level of awareness and technological development in terms of geospatial resource management. Such barriers need to be eradicated, for instance through the use of geospatial technology that can capture, compile, analyse and share information necessary for energy planning and development.

The ECOWAS (Economic Community of West African States) Observatory for Renewable Energy and Energy Efficiency (ECOWREX), a web-based information platform, was developed in response to the existing knowledge and information barriers that are hindering development in the energy sector. Its aim is to provide decision makers, project developers, investors, researchers and the general public with tailored information on the energy sector in the ECOWAS region. This platform also employs a Geographic Information System (GIS) to help visually assess the energy resources in combination with other human activities and plan where and when specific energy technologies can be deployed. To keep up with the demand for data sharing and knowledge transfer, it has become crucial to restructure the ECOWREX map framework.

Focus

The web-based platform ECOWREX, which supports policies and plans towards improving access to energy services while identifying gaps and most favourable technologies, will be improved with new datasets, new standard functionalities for enhancing solar and wind resources, and a Spatial Data Infrastructure (SDI) to support investments in the energy sector in the ECOWAS region.

Rationale

The lack of reliable and up-to-date energy information is a major constraint for local and international investors, decision makers (national governments), and project developers in the energy sector in Western Africa. Different systems and maps exist with various models and data sources, but information on energy resources and their potential is not readily available. There is no efficient and reliable tool to address data consistency, to underpin planning and support policies and to achieve renewable energy targets in order to establish renewable energy as an alternative energy source. As a result, significant opportunities for sustainable energy development in the ECOWAS region remain unexplored.

To help mitigate this problem, ECREEE has developed ECOWREX. However, this platform is still missing some international standards that can improve data discovery, access, and sharing, as well as high quality resource maps and other relevant data on energy access, necessary to support development in the energy sector. The project will enhance the platform by developing new resource maps, enhancing existing renewable energy
Combining solar resources and land use (agriculture, infrastructural development...) will help to discover the best site for the installation of solar power plants (February 2014).

Exploring wind potential in relation to the existing wind power installations in West Africa. Untapped potential for wind power production is visible at a glance (February 2014).

Afterwards, new resource maps will be developed, including energy access maps, ratio maps between power consumption and potential green power production. Already existing solar and wind maps will be improved, by making a comparison with in situ measurement stations and increasing the temporal and spatial resolution. Also included is the production of hourly data for three solar and three wind sites and multi-criteria analysis for the further development of concrete business cases. An energy access map will be developed, using the model of the GIS-based Energy Access Review software (GEAR Toolkit) developed by KNUST for Ghana. This map will include identified gaps and cost-effective technologies for improving energy access. All the data and maps developed will be integrated into the improved ECOWREX platform.

Finally, a validation meeting and training workshop will be conducted for the various ministries of energy, particularly experts from the research and planning departments, on how to develop and effectively use geospatial technology for energy planning and development.

Results

• Improved web-based map framework, incorporated with new software technologies, such as WFS, WCS, KML, to enable easy sharing and transfer of data and knowledge between energy planners.
• Enhanced solar and wind maps with improved temporal and spatial resolutions, needed for accurate planning and renewable energy assessment.
• Maps of power consumption and green power production potential to help evaluate the spatial distribution of energy consumption.
• Energy access map based on the ‘GEAR GIS toolkit’.
• Increased awareness and knowledge in ECOWAS countries of the use of geospatial technology and management of geospatial data.
• ECOWREX Spatial Data Infrastructure (SDI) data requirement guidelines or manual for reference.
• SDI which is fully Open Geospatial Consortium (OGC)-compliant based on open source software solutions.
• A redesigned map visualization tool with improved functionalities for data capture and sharing.