PROMOTING SUSTAINABLE ENERGY ACCESS THROUGH THE USE OF GEOSPATIAL TECHNOLOGIES IN WEST AFRICA (ECOWREX II)

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July 27 2016 @ Dakar, Senegal

Presentation Outline

- The Energy Center
- Work Package(WP)
- WP Implementation
- IntiGIS Model – Methodology

The Energy Centre

The Energy Center is a research center under the College of Engineering, Kwame Nkrumah University of Science and Technology(KNUST).

The Centre promotes energy research, development, and demonstration activities by providing strategic direction from the various departments of the College and the University at large

The Energy Centre

Our Mission

- To strengthen the capacity of energy sector actors in Ghana, West Africa and the African continent as a whole.

The Centre offers contract research services for the design, construction, testing and demonstration of new sustainable energy technologies and systems.

Work package

The Energy Centre is responsible for work package(WP) 5

- ✓ Development of Energy Access maps based on the IntiGIS model.

WP5	Tasks
1	Pre-project expert Analysis
2	Assembly of data collected in WP2, geo-referencing, digitizing and creating of geo-databases
3	Development of scenarios, algorithm and models
4	Development of energy access maps

WP Implementation

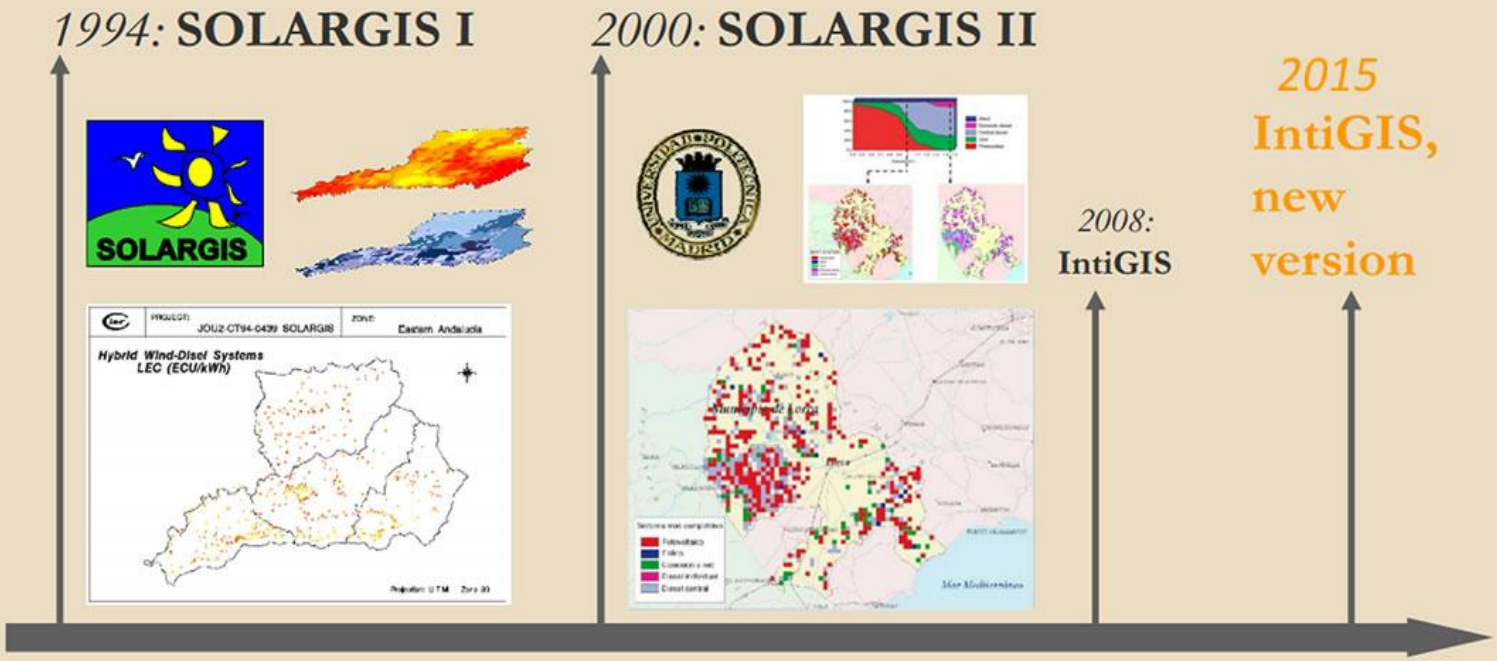
WP5	Tasks	Activities carried out
1.	KNUST Pre-project expert Analysis I. Analysis of data gathered in WP2. ii. Review of existing energy policies, strategies and plans in the ECOWAS region	Project planning, need assessment and data requirements
		Preparation and review of data collection template for energy planning and modelling
		Review of existing electrification planning models
2.	Assembly of data collected in WP2, geo-referencing, digitizing and creating a geo-database.	Data collected from various agencies and departments
		Geo-referencing, digitizing and creating a geo-database
		Dataset sent to ECREEE for validation.

Cont'd

3	Development of Scenarios, algorithm and models (Collaboration between KNUST, CIEMAT and ECREEE)	Implementation of new technology, Levelized Electricity Cost (LEC) for hybrid mini-grid system
		Implementation of a new procedure for electricity demand input in the model
		Implementation of revised and updated technical specifications for all technologies considered
		IntiGIS software development
4	Development of Energy access maps	ArcGIS 10.3 + License procured and installed on workstation to aid in the development of maps

IntiGIS – Introduction

IntiGIS constitutes a project with the main objective to develop a methodology for the application of GIS for rural electrification and implementation of isolated systems using renewable energy.



IntiGIS Model

The IntiGIS methodology provides potential analysis for rural electrification based on a pixel by pixel cost comparison of kWh produced by the systems included in the analysis for both renewable and non-renewable.

In the model, different technology alternatives are compared which allow one to specify the existing or the estimated rural energy demands for a study area.

IntiGIS Model

IntiGIS model is based on a cost calculation of LEC for each technology and compare the results obtained.

It has integrated a methodology for spatial sensitivity analysis to analyze variables influence or weigh in the results from the various technologies.

The IntiGIS Model

- Can be run for autonomous and centralized systems depending on whether they are supplying a single household or an entire community,
- Considers options based on both renewable and conventional energy supply systems. The systems considered by the model are:

Autonomous systems:

- Photovoltaic system.
- Small Wind Turbine system.
- Diesel generator.

Centralized systems:

- Diesel generator.
- Wind-Diesel hybrid system.
- Connection to the pre-existence grid

IntiGIS 2.0

Application Development

- ✓ Involved redevelopment and Upgrade of the existing IntiGIS Software.
- ✓ Programming team led by Franz Alex Gaisie-Essilfie
- ✓ Programming Language: C#
- ✓ Target newer systems (operating systems and GIS software requirements) with long-term support
- ✓ Standalone
- ✓ Optimized algorithms
- ✓ Updated User Interface(UI)

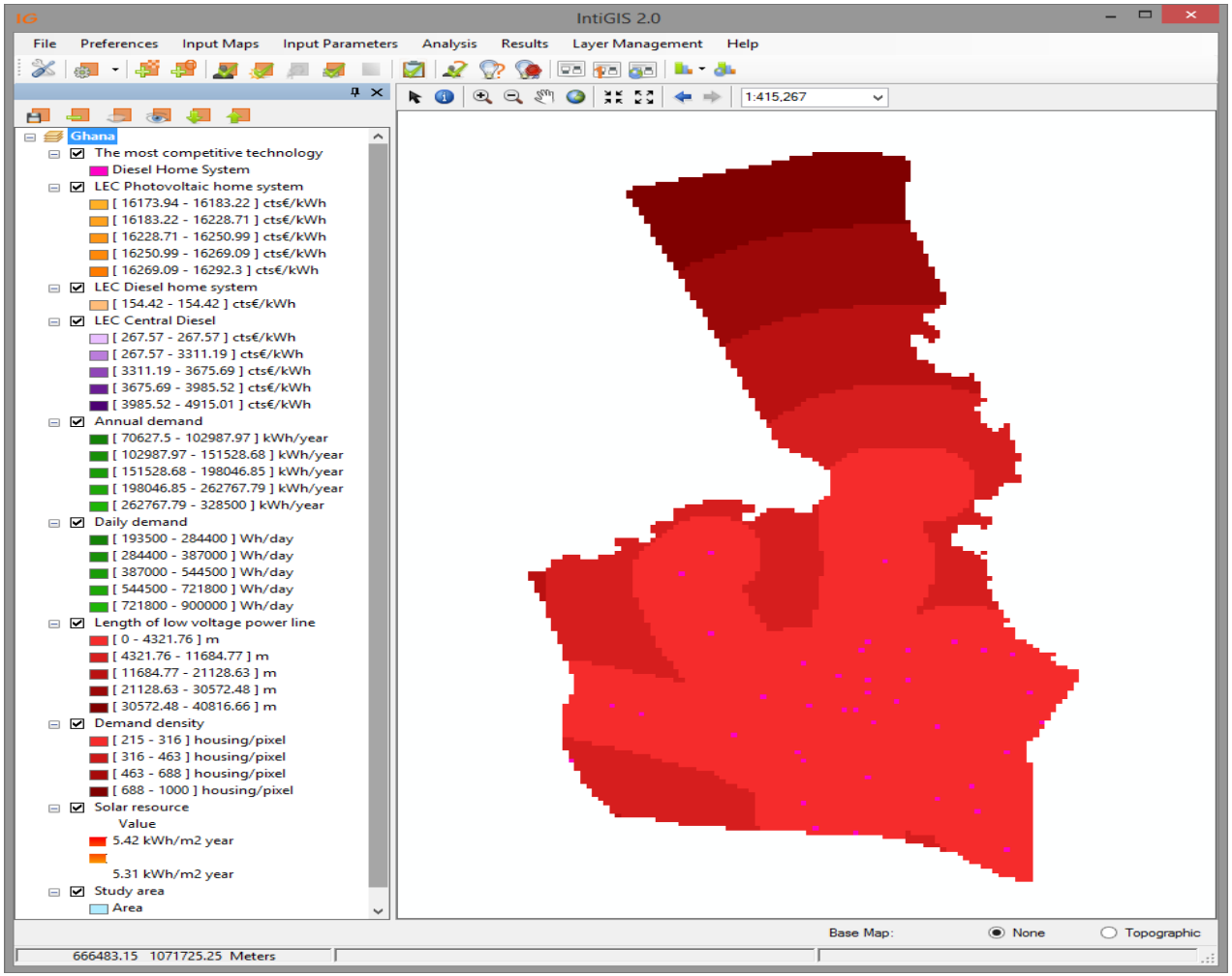
Software Requirement

- ✓ Microsoft Windows OS
- ✓ ArcGIS 10.X Desktop with Spatial Analyst License
- ✓ A preferred PDF viewer

IntiGIS 2.0 User

- **Who uses IntiGIS 2.0**
  - ✓ Sectors: Companies, Universities, Public organizations, etc
- **How to access IntiGIS 2.0**
  - ✓ http://test.stoicteam.com/intigis
  - ✓ Click to install Prerequisites
  - ✓ Click to Lunch Application

IntiGIS 2.0 Interface and its functionalities.



IntiGIS 2.0 Interface

THANK YOU
Merci!