Regional Training Workshop on Geographical Information System for Energy Planning
August 11-12, 2014
Dakar, Senegal

Energy and Rural Electrification Planning, the role of GIS in Nigeria

ACP S&T PROGRAMME
THIS PROJECT IS FUNDED BY THE EUROPEAN UNION
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Ministério do Turismo, Indústria e Energia
UNIVERSITÉ DE GENÈVE

Overview of the Nigerian Power Sector

- Privatization and liberalization of Electricity sector started in the year 2000 and this led to the subsequent restructuring in 2013 through "unbundling" of existing vertically integrated operations into the 18-business Units elements of the industry (6-generation, 1-transmission and 11-distribution companies), so that competitive forces can be introduced into the generation and distribution businesses, while transmission still remains under the government due to its sensitive nature.

- The decisions as to the new structure of the separate sectors sets out the possible relationships between the various elements of a liberalised and restructured electricity supply industry through the introduction of competition, the reduction of external, especially political interference and the opening up of new markets.

- The Electric Power Sector Reform act of 2005 (EPSR act-2005) established the following institution to support the industry;
    - Nigeria Electricity Regulatory Commission (NERC), to regulate activities of the sector industries, set standard and enforce compliance, establish tariff and price level for all classes of consumer, Consumer protection and governance etc.
    - Rural Electrification Agency, to provide electricity to the rural underserved area which represent 40% 0f the geographical distribution in Nigeria.
- Energy supply in Nigeria can be classified into two main categories; (a) urban and (b) rural. Improved energy supply to all urban areas is being mainly addressed by the ongoing Power Sector Reforms, The on-going Power Sector Reforms will enable the extension of the national grid to large rural areas that are close to the main urban areas. However, rural areas that are remote and have a low demand density will depend on off-grid energy solutions. The implementation of improved energy supply across Nigeria will entail the utilization of all energy sources at our disposal, especially renewables.

Power Sector Agencies and Structure

Policy	• Federal Ministry of Power
Regulation	• Nigerian Electricity Regulatory Commission (NERC) • Electricity Management Services (EMS)
Operations	• Transmission Company of Nigeria (TCN) • GenCos • DisCos • Rural Electrification Agency • Nigeria Bulk Electricity Traders
Customers	• Residential • Commercial • Industrial

- The Federal Ministry of Power is in charge of all matters concerning electricity planning development and rural electrification. This is achieved in close collaboration with its extra ministerial departments such as the Transmission Company of Nigeria (TCN), Rural Electrification Agency (REA) and Energy Commission of Nigeria (ECN)

- Despite the increasing awareness on GIS, the Nigerian power industry is yet to fully harness its potential and utilize it in rural electrification and energy planning.

- The Federal Ministry of Power as the policy maker in the Nigerian electricity supply industry is in an excellent position to ensure that emphasis is placed on the adoption of GIS. This can be done by incorporating the major stakeholders in the power industry.

- With a population of around 150-Million people, Nigeria has one of the lowest modern energy consumption rates in the world. Access to electricity in Nigeria is about 20% but wide gaps exist between the access rates in urban areas that average at 40% and in rural areas at 6% to 8%. The networks serve mainly the urban centres and suburbs.
- The urban and rural poor spend more of their income on poor quality energy services from diesel and petrol engine generators at individual residence, commercial and industrial locations.

- **Population: 150 Million.**
- **Access rates/Population: 20%**

- **Classes of Electricity supply:**	**Urban**	**Rural**
- **Access rates/Class**	**40%**	**6%**

Renewable Energy Development Process

2005 – Renewable Energy Master Plan

2009 – Review Master Plan

2012 – Renewable Energy and Energy Efficiency Policy development.

2012 – Renewable Energy and Energy Efficiency Action Plans.

2013 – Revised draft RE&EE Policy adopted in principle.

2014 – Awaiting final approval by National Assembly and President.

- **ECREEE and international partners like GIZ play major role in the RE&EE policy development and capacity building in Nigeria with special focus on Solar, Wind, Biomass and Small hydro Technology.**

Existing National Policies supporting Renewable Energy

- Nigeria Electric Power Policy (NEPP) – 2002

  75% electricity supply coverage by Y2020

- National Energy Policy (NEP) – 2003

  The nation shall commercially develop its renewable energy resource and integrate this with other energy resources into a balanced energy mix.

- Electric Power Sector Reform Act (EPSR) – March 2005

  Established the Regulator to ensure an efficient electricity Industry and develop other sustainable source.

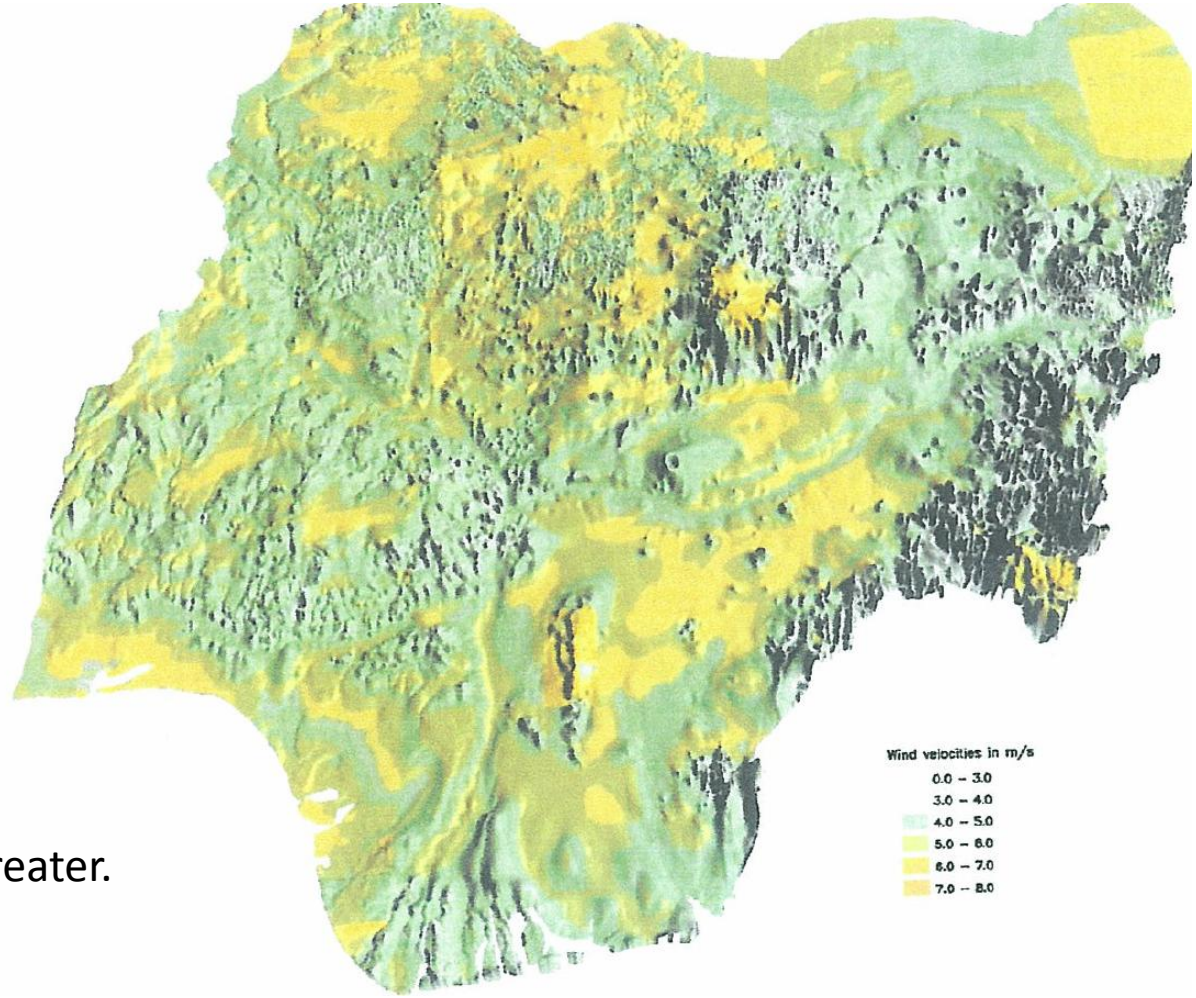
- Rural Electrification Policy Paper – 2009

  At least 10% of renewable energy mix by 2025

- Power Sector Reform Roadmap – 2010

  Demand a National Energy Efficiency and Conservation policy to be developed

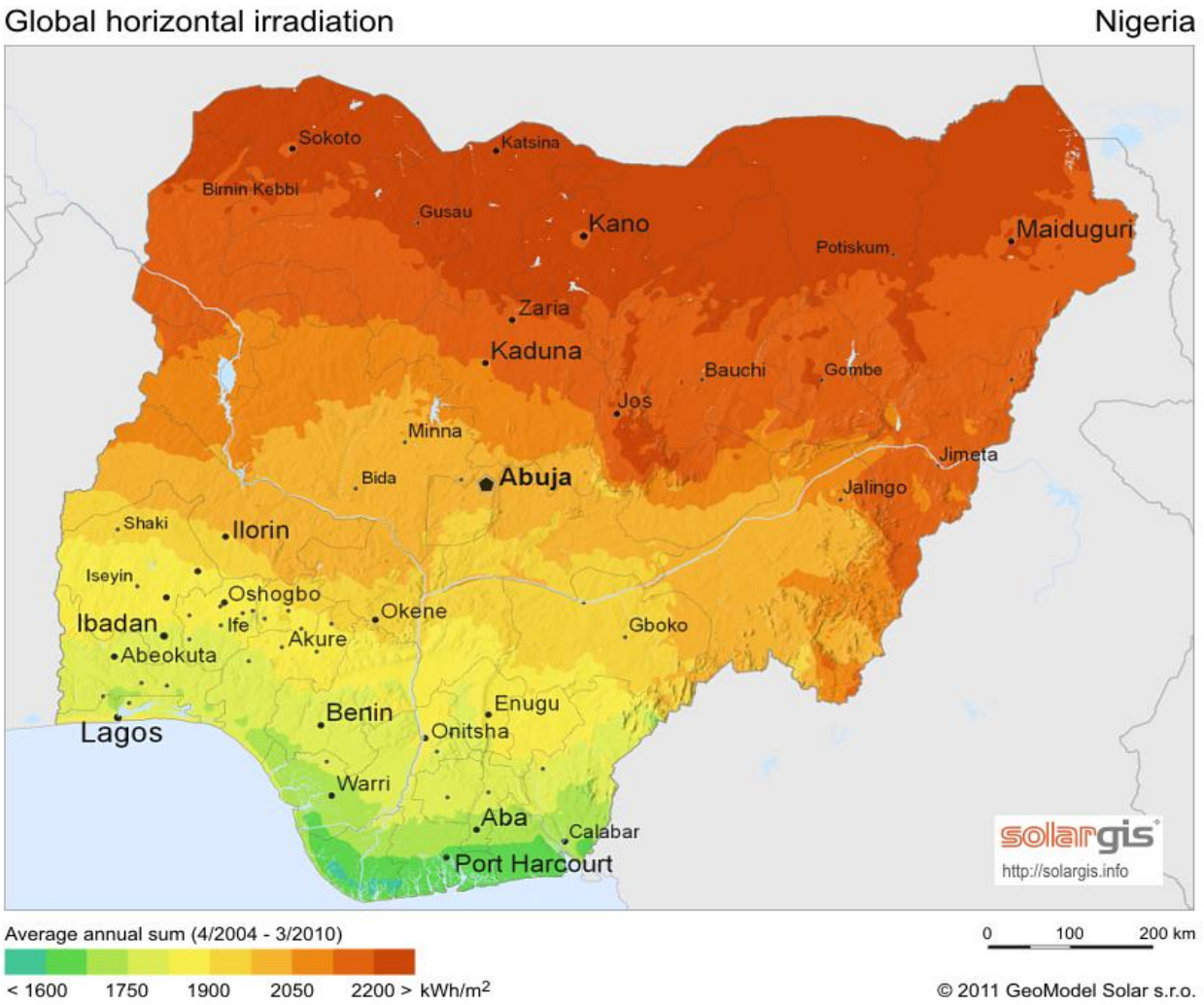
Wind Resource Potential in Nigeria



At 80m, the amount of developable areas is even greater.

Solar Resource Potential in NIgeria

Nigeria has abundant solar resources, but this has not been well tapped



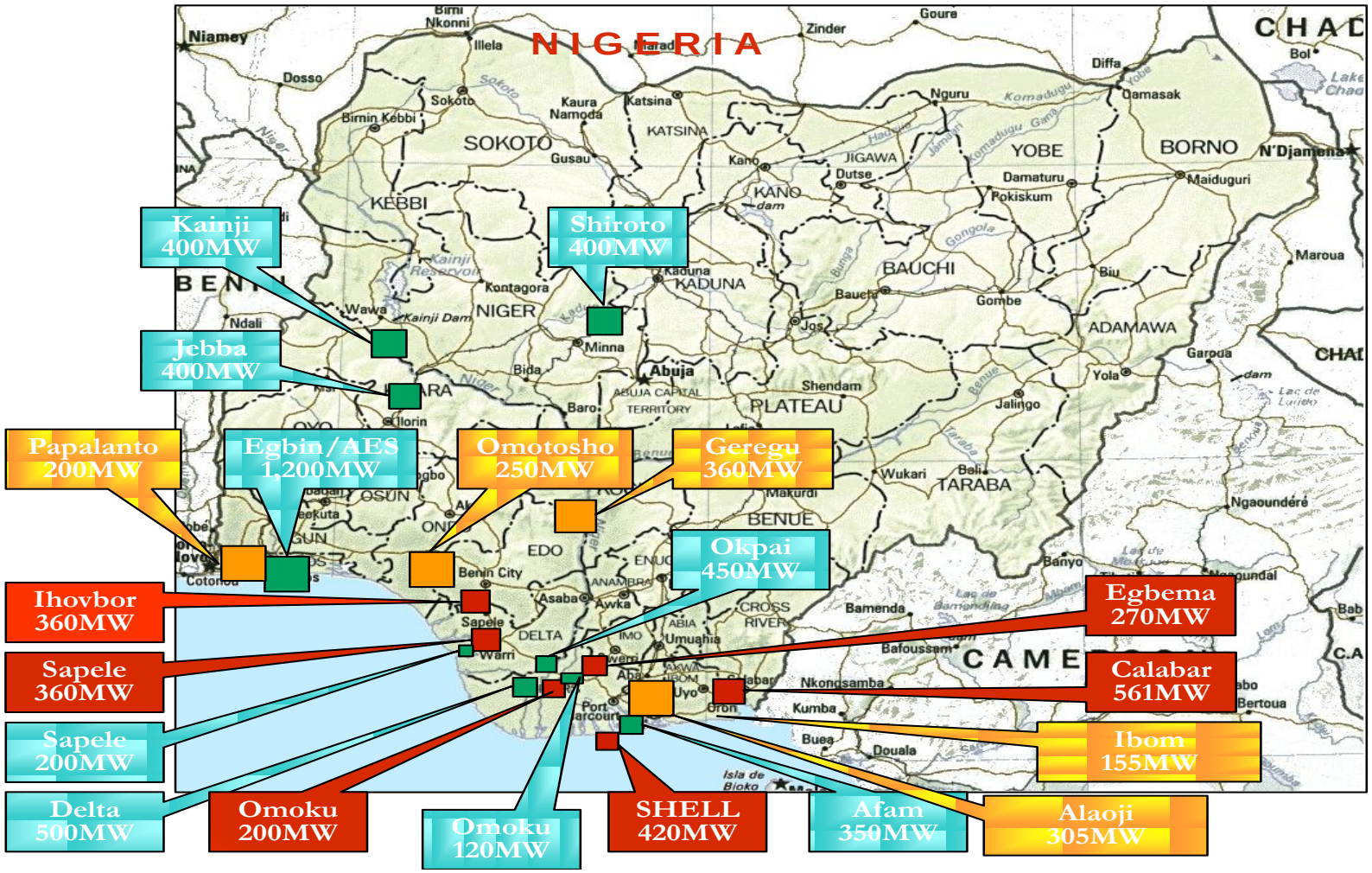
GIS Activities in Nigeria

- The Transmission Company of Nigeria (TCN) is currently in the development stages of deploying GIS to improve the efficiency of its transmission network Stability.

- Another Extra-ministerial Department known as the Energy Commission of Nigeria (ECN) is also actively making strides towards the implementation of GIS in Nigeria to gather and collate energy data with emphasis on Renewable Energy resource maps potential for solar, wind and small hydro technology.

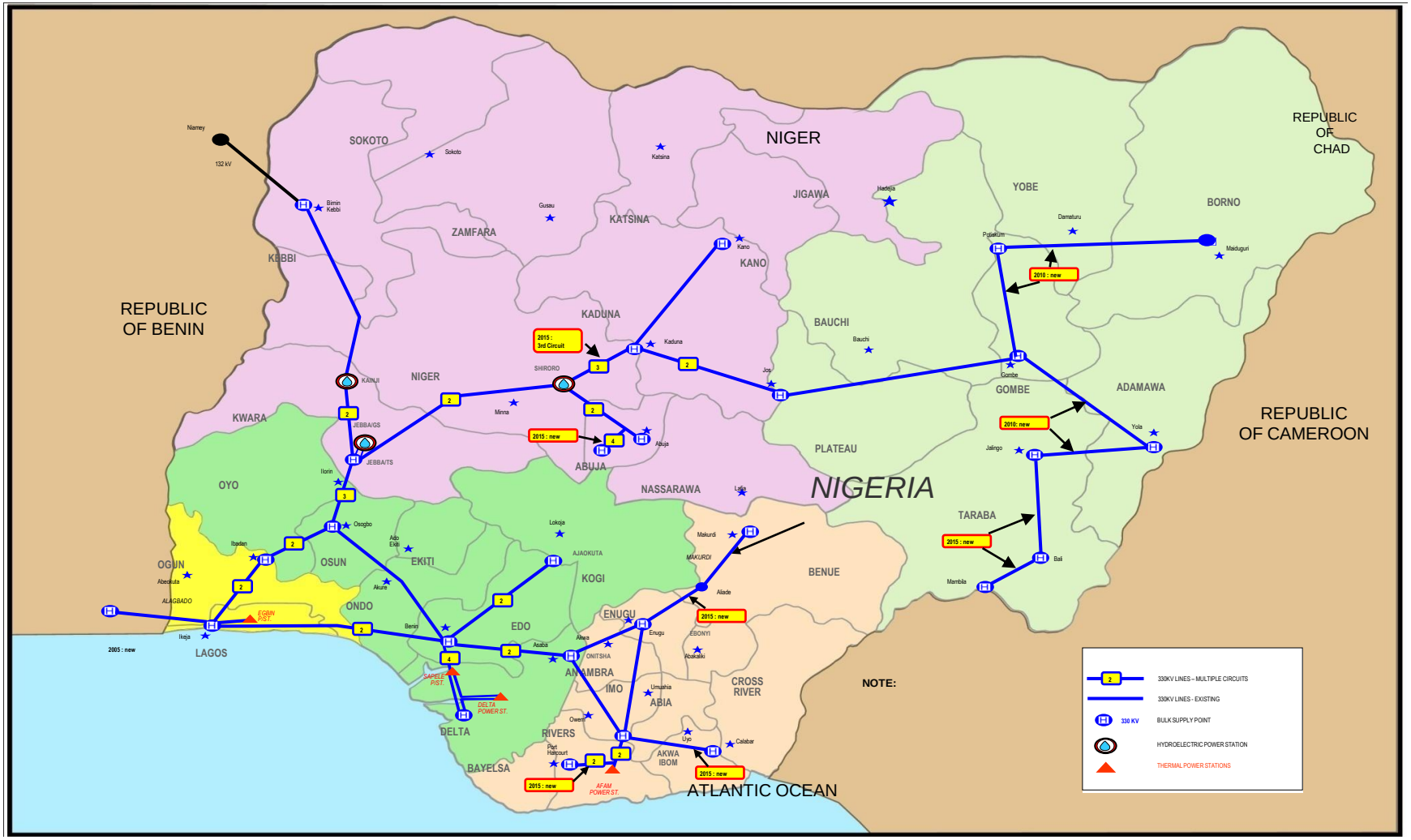
Power Generation Mix

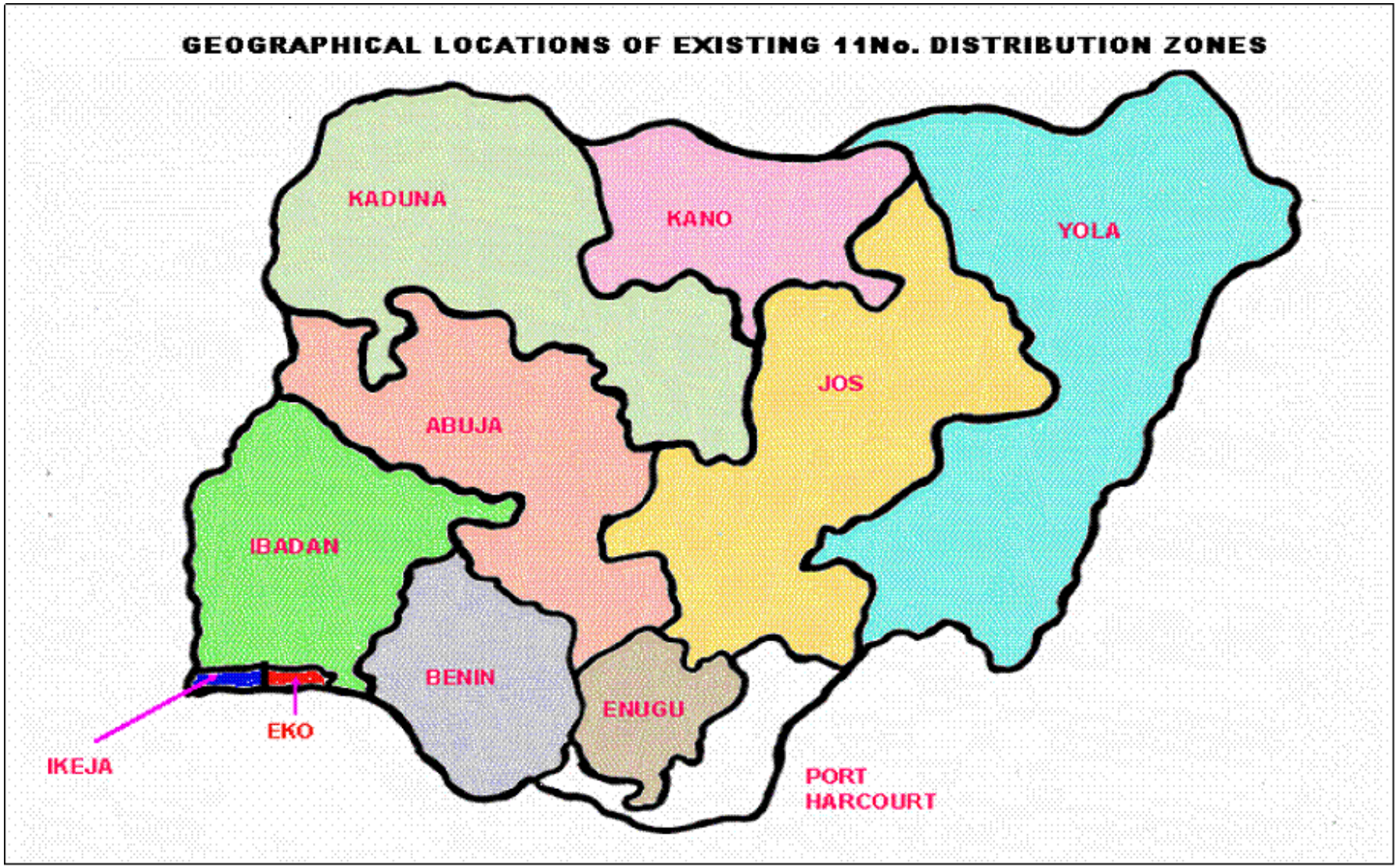
Principal Power Stations



GEOGRAPHICAL STRUCTURE OF THE TRANSMISSION COMPANY OF NIGERIA, TCN

330 kV Grid Structure and Projects




GEOGRAPHICAL LOCATIONS OF EXISTING 11No. DISTRIBUTION ZONES
KADUNA
KANO
YOLA
JOS
ABUJA
IBADAN
BENIN
ENUGU
EKO
IKEJA
PORT
HARCOURT

Implementation of GIS

Thank you!

Engr. Wasiu A. Tijani
watijani@yahoo.com
+2348053462025

Ibrahim Shehu
shehuttabari06@yahoo.com
+2348062948085

Babalola Olurin
babiolurin@hotmail.com
+2348037104907

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