Electricity Market Reform in Nigeria

Learn from the Past or Doomed to Repeat It?

Presented at:
2013 NARUC Annual Conference
International Relations Committee

Orlando, Florida
November 17, 2013

Ted Kury
Director of Energy Studies
Public Utility Research Center
University of Florida

Public Utility Research Center

Research

Expanding the body of knowledge in public utility regulation, market reform, and infrastructure operations (e.g. benchmarking studies of Peru, Uganda, Brazil and Central America)

Education

Teaching the principles and practices that support effective utility policy and regulation (e.g. PURC/World Bank International Training Program on Utility Regulation and Strategy offered each January and June)

Service

Engaging in outreach activities that provide ongoing professional development and promote improved regulatory policy and infrastructure management (e.g. in-country training and university collaborations)

The Body of Knowledge on Infrastructure Regulation

FUNDING PROVIDED BY:
PPIAF Public-Private Infrastructure Advisory Facility
NTFPSI
World Bank
UF Public Utility Research Center
Warrington College of Business Administration
UNIVERSITY of FLORIDA

UF | Public Utility Research Center
UNIVERSITY of FLORIDA

"Leadership in Infrastructure Policy"

PPIAF
PUBLIC-PRIVATE INFRASTRUCTURE ADVISORY FACILITY

World Bank

State of the Nigerian Electricity System

- Population of 155 million people
- Approximately 7,000 MW of installed capacity, but only 3,500 MW of available capacity
- 40% of the country connected to the grid
- Connected population experiences power problems 60% of the time
- Goal of 28,000 MW of generation by 2020

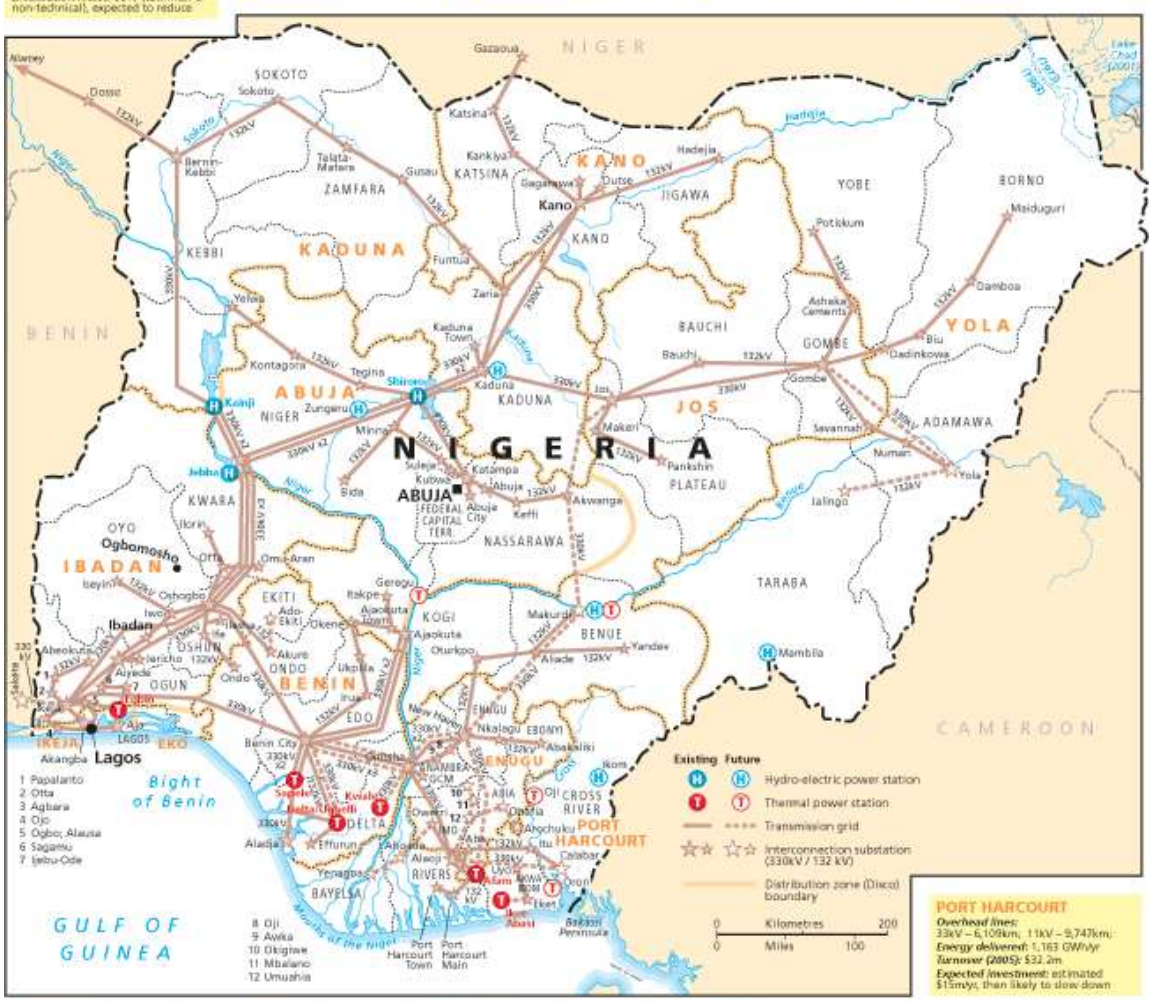
ABUJA
Overhead lines:
33kV – 3,312km; 11kV – 3,804km; low voltage 3p – 3,520km
Cables:
11kV – 355km; low voltage – 262km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 2.1 GWh/yr
Turnover (2005): $62m
Expected investment: avg of $20m/yr for the next six years to improve efficiency and keep up with the growth in demand
Distribution losses: 35% (technical & non-technical), expected to reduce

KADUNA
Overhead lines:
33kV – 1,533km; 11kV – 1,614km; low voltage 3p – 6,535km
Cables:
33kV – 5km; 11kV – 145km; low voltage – 93km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 1,522 GWh/yr
Turnover (2005): $31.2m
Expected investment: estimated $12m for initial six years, then likely to fall
Distribution losses: 25%

KANO
Overhead lines:
33kV – 3,583km; 11kV – 1,253km; low voltage 3p – 2,351km
Cables:
33kV – 4km; 11kV – 156km; low voltage – 17km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered (2005): 1,228 GWh/yr
Turnover (2005): $28m
Expected investment: est $15m/yr for initial six years, then likely to fall
Distribution losses: 40%

JOS
Overhead lines:
33kV – 2,930km; 11kV – 1,395km; low voltage 3p – 12,152km
Cables:
11kV – 20km; low voltage – 56km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered (2005): 438 GWh/yr
Turnover (2005): $9.5m
Expected investment: estimated $15m for initial six years, then likely to fall
Distribution losses: 22%

YOLA
Overhead lines:
33kV – 8,761km; 11kV – 1,407km; low voltage 3p – 21,681km
Cables:
11kV – 2km; low voltage – 29km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered (2005): 438 GWh/yr
Turnover (2005): $9.6m
Expected investment: estimated $15m/yr for initial six years, then likely to fall
Distribution losses: 22%



PORT HARCOURT
Overhead lines:
33kV – 6,109km; 11kV – 9,747km;
Energy delivered: 1,163 GWh/yr
Turnover (2005): $32.2m
Expected investment: estimated $15m/yr, then likely to slow down

IBADAN
Overhead lines:
33kV – 8,088km; 11kV – 4,594km; low voltage 3p – 11,401km
Cables:
11kV – 462km; low voltage – 403km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 2.8 GWh/yr
Turnover (2005): $77.2m
Expected investment: average of $31.4m/yr for the next six years, then likely to fall
Distribution losses: 8%

IKEJA
Overhead lines:
33kV – 7,711km; 11kV – 2,730km; low voltage 3p – 25,742km
Cables:
33kV – 12km; 11kV – 110km; low voltage – 262km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 3,520 GWh/yr
Turnover (2005): $117m
Expected investment: estimated $15m for initial six years, then likely to fall
Distribution losses: 18%

EKO
Overhead lines:
33kV – 545km; 11kV – 2,347km; low voltage 3p – 3,980km
Cables:
33kV – 317km; 11kV – 462km; low voltage – 262km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 2,629 GWh/yr
Turnover (2005): $102.1m
Expected investment: avg of $17m/yr for the next six years, then falling
Distribution losses: 18%

BENIN
Overhead lines:
33kV – 4,133km; 11kV – 5,168km; low voltage 3p – 12,870km
Cables:
33kV – 11,346km; 11kV – 132km; low voltage – 150km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 438 GWh/yr
Turnover (2005): $9.6m
Expected investment: avg of $18m/yr for the next six years, then likely to fall
Distribution losses: 21%

ENUGU
Overhead lines:
33kV – 4,092km; 11kV – 3,210km; low voltage 3p – 20,598km
Cables:
33kV – 6km; 11kV – 178km; low voltage – 213km
Ground mounted transformers:
33/11kV; 33kV/415V
Energy delivered: 2.2 GWh/yr
Turnover (2005): $57.8m
Expected investment: avg of $21m/yr for the next six years, then likely to fall
Distribution losses: 6%

Source: Global Energy Network Institute

Electricity Market Reform

- Electric Power Sector Reform Act of 2005
- Transition of national electric utility to
  - 11 distribution companies
  - 6 generating companies
  - transmission company
- Most of the $2.6 billion privatization proceeds devoted to the settlement of staff benefits

Market Transition Challenges

- Distribution companies have new investors with little experience in the Nigerian market
- Distribution companies have not developed credit worthiness
- Poor capacity factor on existing generation
- Inadequate and unreliable transmission capacity

Multi-Year Tariff Order

- First introduced in 2008
- Current incarnation known as MYTO II
- Provides a 15 year tariff path for the electricity industry
- Utilizes building block methodology
  - Return on capital
  - Return of capital (depreciation)
  - Operating expenditures
- Combines historical cost of service data with forward-looking incentives for efficiency improvement

Transmission Company of Nigeria

- Currently under a 3 year management contract with Manitoba Hydro International
  - Manage system
  - Provide training to TCN staff
- Transition to ring-fenced Transmission Service Provider, Market Operator, and System Operator

Nigerian Bulk Electricity Trading PLC

- Responsible for buying power from IPPs and reselling to distribution companies and large consumers
- Not the sole authorized buyer – goal is to eventually phase out purchase responsibilities
- Empowered to enter into PPAs

Critical Success Factors 2013-14

- 4,700 MW of National Integrated Power Projects to be completed and handed over to private investors 1Q14
- Transmission capacity expansion plan
- Improved management and operational efficiency levels in TCN
- Improved collection efficiency
- Conclusion of labor negotiations and settlements
- Improved pipeline safety

Conclusions

- Nigeria has made great strides in transforming their electricity market
- Strategy picks and chooses from different experiences, but not copied directly from anyone
- 2014 will be an important year in the evolution of the market

References

- Oseni, Musiliu (2011) "An analysis of the power sector performance in Nigeria", *Renewable and Sustainable Energy Reviews*, Volume 15, Issue 9 (December)
- Presidential Task Force on Power Fact Sheet (Updated as of August 16, 2013)
- "Roadmap for Power Sector Reform – Revision 1", The Presidency of the Federal Republic of Nigeria, August 2013