Case Study: Enabling Environment for Nigeria Reforms

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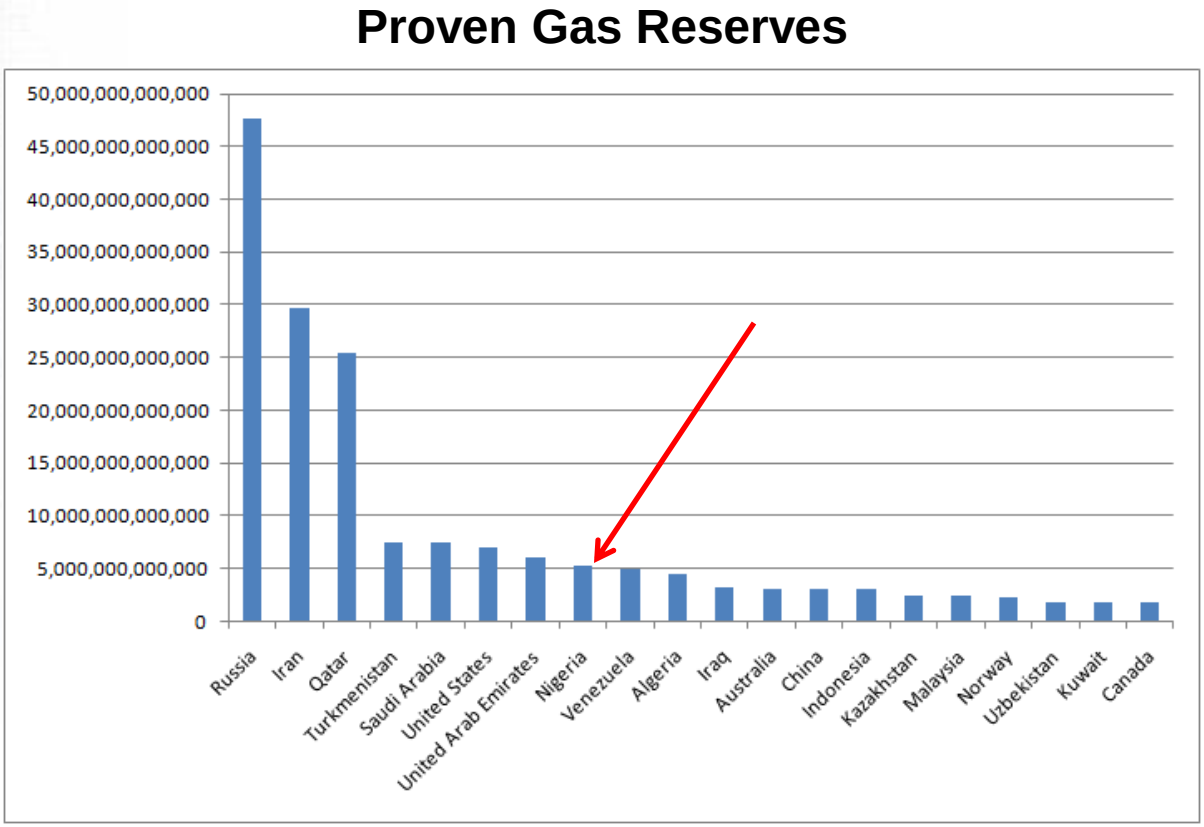
Snapshot: Nigeria



It is hard to exaggerate Nigeria's power-poverty. The seventh-most-populous country in the world, and seventh-biggest oil exporter, has as much grid power as Bradford, a post-industrial town in the north of England.

(The Economist, May 28th, 2011)

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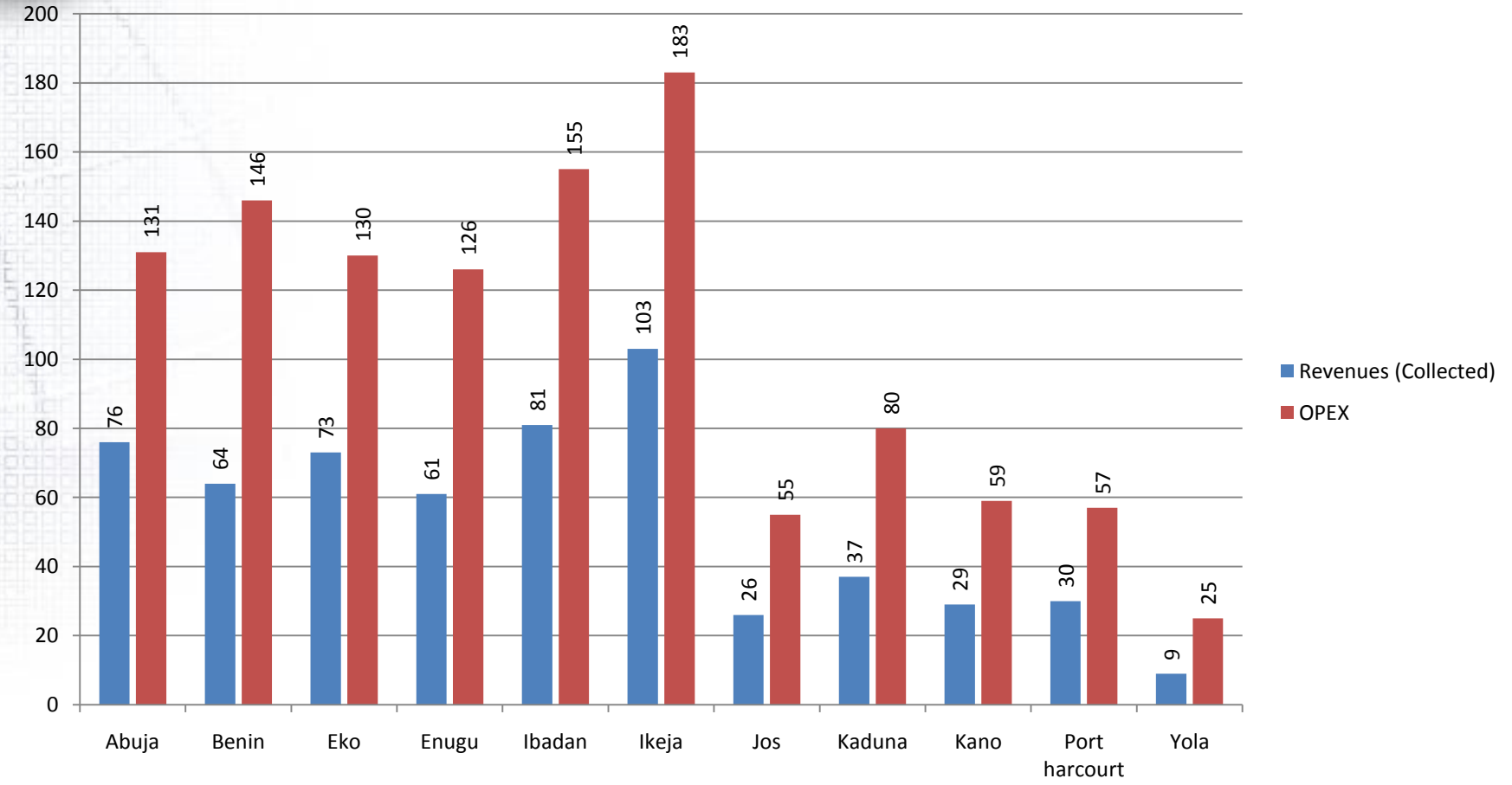
Snapshot: Nigeria

- Only 40% of the nation's population have access to electricity supply
- High operating costs, more than 80% goes into staff salaries and welfare.
- High energy losses (technical and non-technical losses)
- Low tariff collection rates, and sustained lack of investment in transmission and distribution infrastructure
- Distribution and Transmission network has to grow at the rate of at least 16% year on year to handle an equivalent of 13000MW by 2013

Inadequate Commercial Revenue



Source: Bureau of Public Enterprises

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Enabling Environment

- Power Sector reform initiated in 2005 - Electricity Power Reform Act (EPSR)

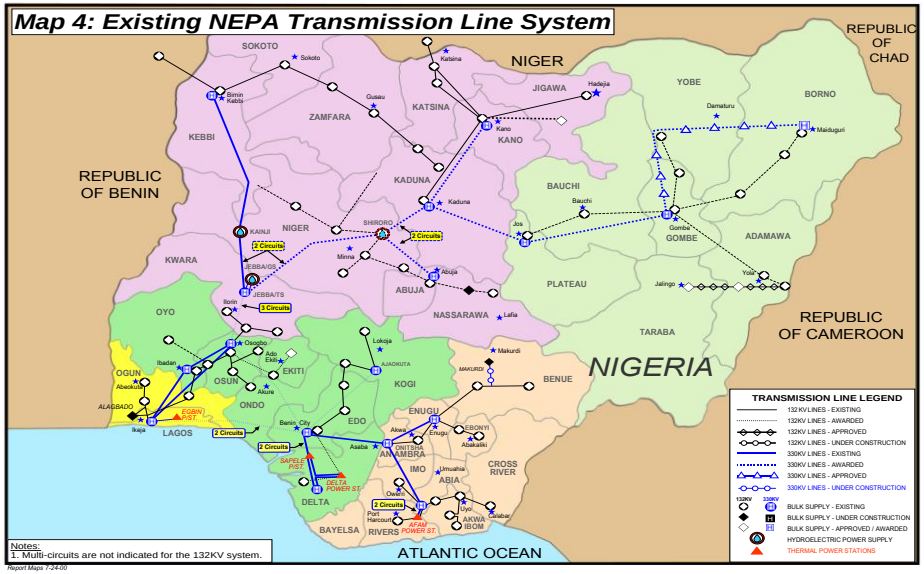
- Unbundling of vertically integrated National Electricity Power Authority (NEPA) into the Power Holding Company of Nigeria (PHCN) successor companies:
  - 6 state owned generation companies (GENCOs)
  - 1 Transmission Company of Nigeria (TCN)
  - 11 state owned distribution companies (DISCOs)

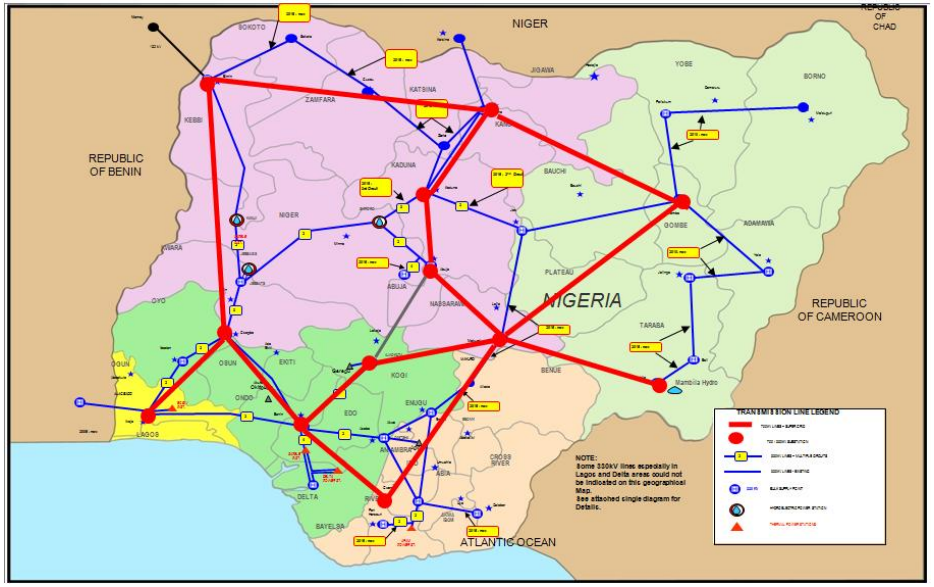
- Establishment of the Nigeria Electricity Regulatory Commission (NERC)

Reform Objectives

- Roadmap of Power Sector Reform based on 3 primary pillars:
  - **Cost Reflective tariffs** on the retail side
    - Ensure transparent and responsible management
    - Improve efficiency and performance
    - Improve management and technical operation
  - Establishment of a **creditworthy Single Buyer** (Bulk Trader)
  - Increasing **private sector participation** in Generation and Distribution
    - Limit political interference and eliminate government's involvement in utility management
    - Promote private sector participation and ensure level playing field for all investors

Transmission Investments





Long-Term Goal

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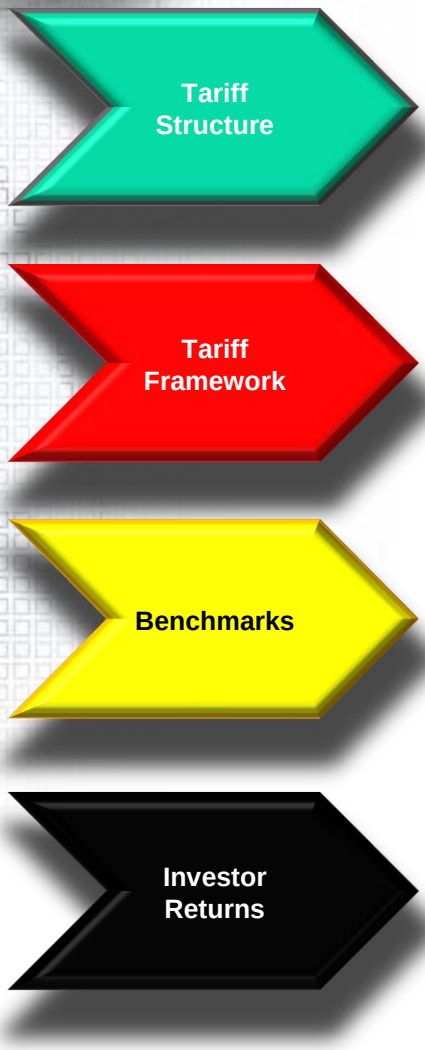
Tariff Reforms



- EPSRA requires NERC to establish cost-reflective Tariffs
- NERC has developed initial drafts of this tariff and is undertaking extensive consultations with stakeholders to ensure appropriateness of the tariff assumptions
- Tariff framework based on the U.K.'s incentive regulation structure, and allows for 5-year major reviews with intervening minor annual reviews
- Full model for the Multi-Year Tariff Order is expected to be finalized by Q3 2011, with an effective tariff date as of early 2012
- Stranded assets and staffing liabilities transferred to Nigeria Electricity Liability Management Ltd (NELMCO)
- Fair investor returns balanced with the expected performance of an efficient IPP
- Tariff relies on performance targets for reducing technical and non-technical losses, and increasing collections rates
- Generation costs assumed based on the costs of a new entrant IPP using latest technology

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Estimated Regulatory Revenue

Regulated costs (nominal) (NGN '000)			2011	2012	2013	2014	2015
	N'000						
Total Generation	Vesting contract costs + PPAs		294,165,820	430,946,075	539,673,505	671,356,117	736,287,629
	Annual NERC Licence charge		4,412,487	6,464,191	8,095,103	10,070,342	11,044,314
	Total		**298,578,307**	**437,410,267**	**547,768,607**	**681,426,459**	**747,331,943**
Transmission	Opex	Var O&M Costs	1,245,661	1,689,766	2,123,121	2,454,170	2,679,054
		Admin costs (fixed)	8,419,276	9,745,312	11,356,943	13,329,005	15,759,228
		Fixed O&M Costs	513,322	513,322	513,322	513,322	513,322
		Total	10,178,259	11,948,400	13,993,386	16,296,496	18,951,604
	Return on Capital		29,472,353	30,928,939	54,328,351	77,916,887	101,973,724
	Return of Capital		3,791,970	13,017,228	13,355,523	11,323,499	16,127,449
	Annual Corpoarate HQ Admin charge on TCN		0	0	0	0	0
	NERC charge		651,639	838,419	1,225,159	1,583,053	2,055,792
	Ancillary service charge 1%		434,426	558,946	816,773	1,055,369	1,370,528
	Total		**44,528,647**	**57,291,931**	**83,719,191**	**108,175,304**	**140,479,095**
All Discos	Opex	O&M Costs	16,029,772	24,201,472	34,073,939	44,448,294	55,161,464
		Admin costs (fixed)	33,488,062	38,762,432	45,172,769	53,016,738	62,683,064
		Fixed O&M Costs	4,832,163	5,025,450	5,226,468	5,435,526	5,652,948
		Total	54,349,998	67,989,353	84,473,175	102,900,558	123,497,476
	Return on Capital		67,570,763	71,317,879	72,905,345	75,365,730	77,551,343
	Return of Capital		58,979,799	61,838,364	65,166,040	68,621,023	72,170,242
	Bulk Trader charge		964,211	833,043	859,030	796,165	794,543
	Market and System Operator charges		7,249,720	8,631,938	10,207,789	11,761,241	13,578,381
	NERC charge		2,836,717	3,159,159	3,504,171	3,891,671	4,313,880
	Total		**191,951,207**	**213,769,736**	**237,115,549**	**263,336,389**	**291,905,866**
Total			**535,058,161**	**708,471,933**	**868,603,348**	**1,052,938,152**	**1,179,716,904**

Energy consumption	2011	2012	2013	2014	2015
Billed sales (all discos) (GWh)	28,294	36,905	45,599	51,808	55,563
Revenue collected sales (all discos) (GWh)	26,030	34,691	43,775	50,772	54,452

Regulated Tariff					
Average tariff (NGN/MWh) (billed sales)	18,910.81	19,197.22	19,048.57	20,323.66	21,232.12
Average tariff (NGN/MWh) (Revenue collected sales)	20,555.22	20,422.57	19,842.26	20,738.43	21,665.43
Total	**20.56**	**20.42**	**19.84**	**20.74**	**21.67**

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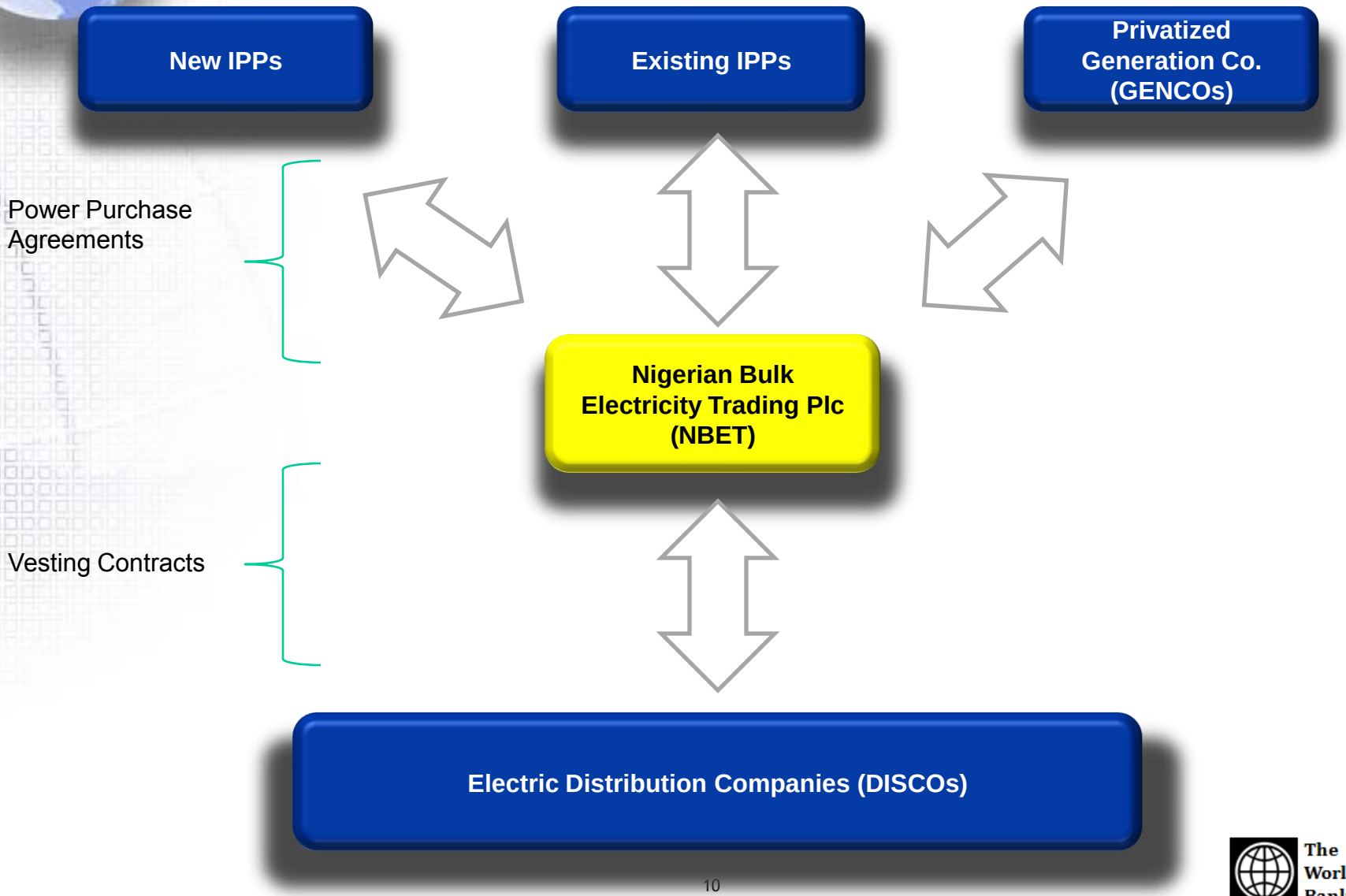
Transitional Single Buyer



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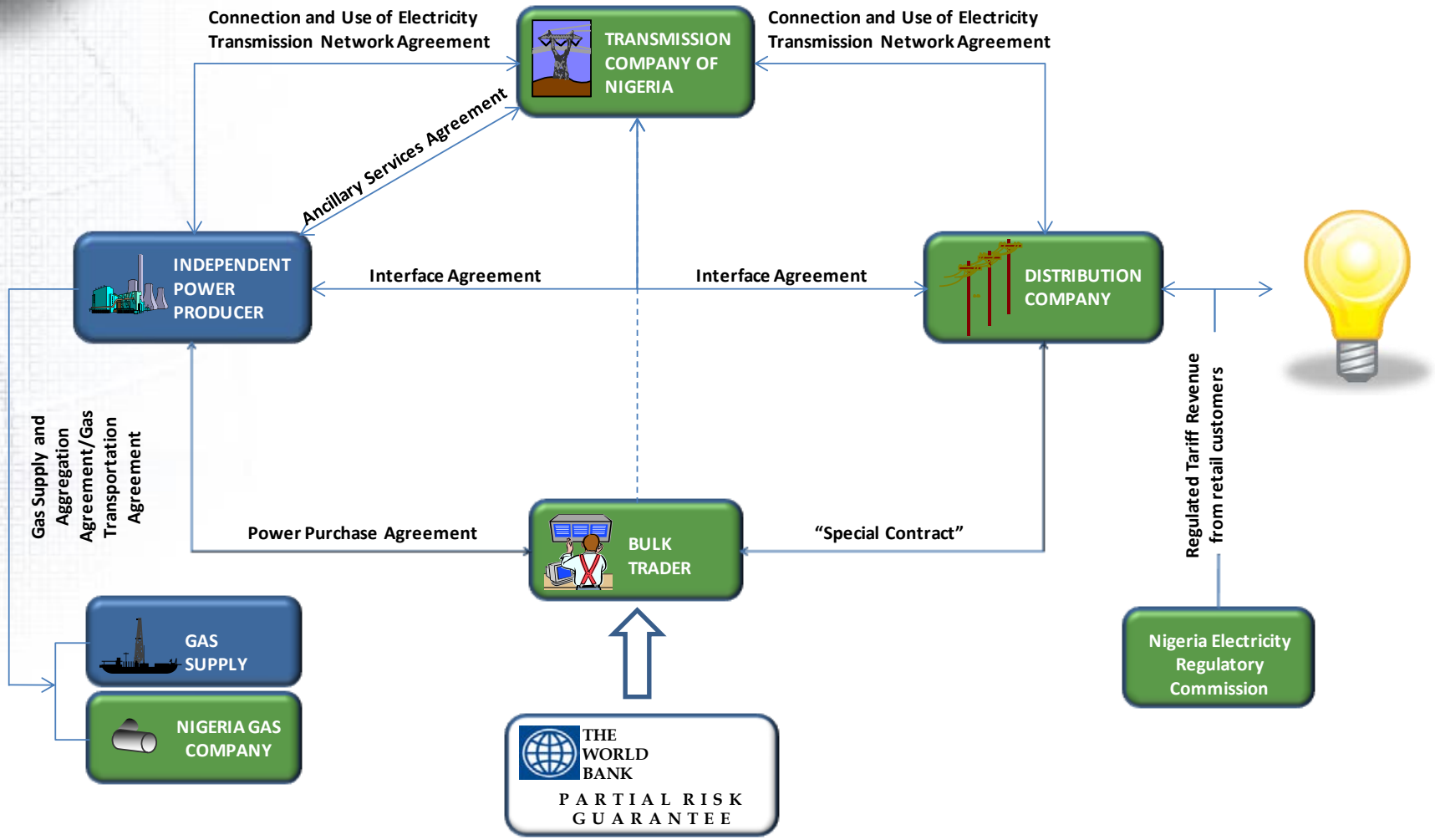
Outline of Transaction Structure



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Policy Reforms

- Grid Code
- Market Rules
- Distribution and Metering Codes
- Model interconnection and transmission service agreements
- Transmission system operated by Manitoba Hydro as management contractor
- Transfer liabilities to a government-owned special purpose vehicle

Renewable Energy Policy

- Encourage embedded generation, thereby reducing the loan on the transmission network and reducing distribution losses associated with the network
- Encourage development and innovation in renewable energy technology with a target of 10% of the generation mix
- Reduce greenhouse gas emissions by reducing reliance on fossil fuels

Feed-In Tariff Structure

- FiT to encourage development of wind (onshore), solar (ground-mounted solar PV without tracking), small hydro (<30 MW), and biomass/biodiesel generation

- FiT structure technology-specific and takes into consideration typical CAPEX, OPEX, fuel costs (where applicable), financing costs, returns on capital, plant life, parastic load, and capacity of plant

Technical FiT Assumptions

S/N	Description	Units	Assumptions			
			Wind	Solar	Small Hydro	Biomass
1	Installed capacity	*MW*	10	5	10	5
2	Capital cost	*US$/kW*	2,525	5,545	3,500	4,000
3	O&M Cost (Fixed)	*NGN/MW/Yr*	2,900,000	9,570,000	5,655,000	8,370,000
4	O&M Cost (Var.)	*NGN/MWh*	232	87	87	775
5	Capacity Factor	*%*	38	33	60	68
6	Auxiliary Requirement	*%*	1	1	1	10
7	Economic life	*Years*	25	25	25	25
8	Construction period	*Years*	3	3	3	3

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