On his official visit to Nigeria from November 23-24, 2010, the President of the African Development Bank Group, Dr. Donald Kaberuka held discussions on Nigeria’s transformation with the President of Nigeria, His Excellency, Dr. Goodluck Ebele Jonathan, members of his cabinet and senior policy makers. The Nigerian officials identified meeting the demand for critical infrastructure facilities across the board as the government’s foremost priority.

The Government of Nigeria requested the African Development Bank (AfDB) to prepare a report on the state of infrastructure in the country. The Bank accepted this request cognizant of the fact that, policy actions and investment in infrastructure have important roles to play in Nigeria’s economic transformation. Infrastructure development is a key contributor to a conducive business environment. It is a precondition for private sector development and a key enabler of regional integration. Investments in infrastructure are critical to advances in agriculture, which is one of the key pillars of the Nigerian economy, and human development, including the delivery of health and education services to the poor. The activities involved in Infrastructure sector upgrades can be a stimulus for growth and creation of productive employment. In a nutshell, studies have shown that increasing the stock of infrastructure investments in core sectors by one percent can increase GDP growth by up to one percentage point. In recognition of these facts, the development of Africa’s infrastructure is a key component of the strategic direction being pursued by the Bank.

The AfDB continues to lead on several key continental infrastructure initiatives. It has a mandate from the African Union to implement the infrastructure component of the New Partnership for Africa’s Development (NEPAD), and it hosts the secretariats of the Infrastructure Consortium for Africa and of the African Water Facility. The AfDB is also the Executing Agency for the Programme for Infrastructure Development in Africa (PIDA). This programme, which is designed as a successor to the NEPAD Medium to Long Term Strategic Framework (MLTSF), aims to develop a vision and strategic framework for the development of regional and continental infrastructure.

In line with its leadership role, the AfDB seeks to deepen and broaden its knowledge base of Nigeria’s economy by undertaking economic and sector work in areas deemed as critical for enhancing competitiveness and public sector effectiveness. This Flagship Report, which is entitled “An Infrastructure Action Plan for Nigeria: Closing the Infrastructure Gap and Accelerating Economic Transformation”, is part of efforts aimed at enabling the Bank to strengthen its knowledge base in Nigeria’s infrastructure sector. The Report, a policy and technical document commissioned by the Bank serves four purposes: (i) provide the Government with a master plan for the rehabilitation of infrastructure assets and recovery in infrastructure services in Nigeria in the decade ahead; (ii) contribute to the ongoing High Level Policy dialogue on infrastructure and economic transformation in Nigeria; (iii) serve as a framework to intensify engagement with the international community on infrastructure in connection with the Transformation Agenda; and (iv) provides a solid platform from which a strategy for possible AfDB and other donor operations in Nigeria can be scaled up.

The Report provides a detailed assessment of the current status of services in four key infrastructural sectors in the country and their role within the West Africa region (transport, electric power, information and communication technologies, and water and sanitation). It sets achievable objectives for Nigeria’s infrastructure by 2020 taking into account the Government’s Vision 20:2020, and lays out an action program for achieving these objectives, which includes policy and institutional reforms, capital expenditure programs for rehabilitation and new capacity, and increased resource allocations for maintenance of these facilities. It provides options for financing the proposed program, with a special focus on efficient and sustainable use of oil revenues for infrastructure development. It also identifies the specific areas where there is a role for the private sector, and discusses improvements in the current policy environment that will be required to attract private sector investments into the infrastructure sector.

Janvier K. Litse
Regional Director
Operations Regional West -A

Ousmane Dore
Resident Representative
Nigeria Field Office (NGFO)
Preface

The Nigerian Government’s Transformation Agenda and the Vision 20:20:20 aim to promote sustained and inclusive economic growth, and elevate Nigeria’s economy to be among the top 20 economies in the world. Considering that these objectives cannot be achieved without the availability of appropriate economic and social infrastructure, the Government has prioritized the improvement in the quality of infrastructure services. In line with this commitment, this publication seeks to contribute to the body of knowledge regarding this complex sector, and to assist by providing current information and analysis in order to inform and facilitate decision making.

The report provides a detailed assessment of the current state of infrastructure and related services in the Water and Sanitation, Transport, Electric Power, and Information, Communications and Technology sectors in Nigeria, and their role in facilitating regional integration in the West Africa region. The main report is divided into two parts: Part A reviews the country context, including infrastructure and growth issues in Nigeria, and the proposed policy options and action plans that can be pursued by Nigeria in order to improve the quality of infrastructural services. Part B of the report provides detailed data and assessments of the current state of the infrastructure and related services in the four key infrastructure sectors under review. A separate summary report is also available. The full report and a detailed Annex to the report are available online at http://www.afdb.org/en/countries/Western-africa/Nigeria/infrastructure-and-growth-in-Nigeria-an-action-plan-for-strengthened-recovery/

The preparation of the report was based on broad stakeholder participation. This involved numerous rounds of consultations with Government officials and various key stakeholders between 2010 and 2013 to forge a consensus on the core priorities as well as actions, which need to be taken. In recognition of the fact that this report is not an end in itself, the African Development Bank looks forward to continued dialogue to develop new approaches aimed at addressing the infrastructural challenges facing Nigeria.

Zondo Sakala
Vice President
Country and Regional Programs and Policies
The Infrastructure Action Plan for Nigeria: Closing the Infrastructure Gap and Accelerating Economic Transformation Report was prepared by a team of staff and consultants from the African Development Bank (AfDB) led by Ousmane Dore, the Resident Representative of Nigeria Field Office (NGFO). The AfDB staff in the team comprised of: John Baffoe, Chief Country Economist, Peter Sturmheit, Country Program Officer, Francis Ntamu and Aude Apetey, Private Sector Specialists, Reni-Callie Okoro, Infrastructure Engineer, Usman Mohammed, Principal Disbursement Officer, Danladi Ebbah, Agricultural Engineer, Gregory Osobor, Social Sector Expert, Bokar Toure, Senior Power Economist, Jaafar Abba, Principal Procurement Officer. Special thanks go to Aloysius Uche Ordu, then Vice President, Operations, Country and Regional Programs and Policy, and Valentine Zongo, now Resident Representative in Democratic Republic of Congo (DRC) for their guidance and for their invaluable inputs. The Team was assisted by consultants namely, Russell Cheetham, Lead Consultant to the Department and prime author of the Report's main sections on infrastructure, as well as Tedd Briggs, Wendy Brennen, Aako Ugbabe, Joseph Okpaku, and Eleri Ewah for their sectoral contributions. The team also benefited from support provided by Solomon Abebe Asfaw and Jean-Pierre Mutzins, both Power Sector Experts from the Energy Sector Department of the African Development Bank. Andoh Mensah, Principal Country Program Officer at the Nigeria Field Office (NGFO), is also acknowledged for facilitating communication, executing outstanding processes, coordination and completion of the study, and publication of the findings. The Report also benefited a great deal from the general directions provided by the team at the Regional Director's office ((ORWA).

The work undertaken for this Report was initiated at the request of the Government of Nigeria. It was carried out under the guidance, leadership and support of Mr. Zondo Sakala, Vice President for Operations, Country and Regional Programs and Policy,(ORVP) and also from the contributions of the Nigeria Task Team – a Bank-wide team charged with facilitating support to the AfDB's engagement with Nigeria.

The preparation of this Report also benefitted from comments, insights and generous support of other AfDB staff too numerous to mention, but by this acknowledgement, their contributions are recognized and the team's appreciation is registered. The team appreciates the strong support of the Executive Director for Nigeria, Mr. Shehu Yahaya.

A large number of key officials and representatives from the fifty-two (52) Government Ministries, Departments and Agencies also provided extremely valuable inputs and comments at various stages of the Report, including during the Consultative Workshop held in 2011. The Presidential Task Force on Power Sector Reform, the Nigerian National Petroleum Corporation (NNPC) and the National Bureau of Statistics (NBS) are particularly acknowledged, for providing valuable time series data which formed the basis of assumptions and assessments carried out in the report.

Clara Kayser-Bril provided excellent research support for the report. She painstakingly organized the data and tables in the report. We also thank her for meticulously formatting and organizing several versions of the draft document and manuscript as it went through multiple review processes.

The valuable editorial assistance of Ananda Covindassamy deserve special acknowledgement, as does the AfDB's Statistical Department (ESTA), which provided the statistics and other background information on Nigeria. The country and regional maps were produced by Krollmaps.com. The maps and diagrams used in this publication in no way imply recognition of any states or political boundaries by the African Development Bank or the authors. Most of the images in this report were assembled from visits, reports and supervisions to the projects financed by the African Development Bank and being implemented in Nigeria.
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<tr>
<td>t</td>
<td>Tonne = 1,000kg</td>
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<tr>
<td>GW</td>
<td>Gigawatt = 1,000,000 kW or 1,000 MW</td>
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<tr>
<td>GWh</td>
<td>Gigawatt-hour = 1,000 MWh</td>
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<tr>
<td>kVA</td>
<td>Kilovolt Ampere = 1,000VA</td>
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<tr>
<td>kW</td>
<td>Kilowatt = 1,000 W</td>
</tr>
<tr>
<td>Oil</td>
<td>Barrel = 0.1364 metric tonnes</td>
</tr>
<tr>
<td>NG</td>
<td>Billion cubic feet NG = 0.028 billion cubic meters NG</td>
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<tr>
<td></td>
<td>Billion cubic feet NG = 0.021 million tonnes LNG</td>
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<tr>
<td>kW</td>
<td>Kilowatts = 1,000 watts</td>
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<tr>
<td>kWh</td>
<td>Kilowatt-hour = 1,000Wh</td>
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<tr>
<td>MVA</td>
<td>Megavolt Ampere = 1,000 kVA</td>
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<tr>
<td>MW</td>
<td>Megawatt = 1,000 kW</td>
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<tr>
<td>MWh</td>
<td>Megawatt-hour = 1,000 kWh</td>
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<tr>
<td>Oil</td>
<td>Barrels/day = 49.8 tonnes/year</td>
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Acronyms and Abbreviations

AIDB  African Development Bank
ADF   African Development Fund
AIF   Actis Infrastructure Fund
AIIF  Africa Infrastructure Investment Fund
ALRP  Abuja Light Rail Project
AWF   African Water Facility
BOO   Build, Operate, Own
BOQ   Bill of Quantities
BOT   Build, Operate, Transfer
BPE   Bureau of Public Enterprises
bscf  Billion Standard Cubic Feet
CAP   Community Action Plan
CAS   Centre for Arid Zone Studies
CBO   Community Based Organisation
CBDA  Chad Basin Development Authority
CBN   Central Bank of Nigeria
CDO   Community Development Officer
CFL   Compact Fluorescent Lightbulbs (and lamps)
CIA   Central Intelligence Agency (United States)
CPRP  Community-Based Poverty Reduction Project
CSO   Civil Society Organisation
CSP   Concentrated Solar Power
DFID  Department for International Development, UK
DISTCOs Distribution Company (for electricity)
DMB   Deposit Money Bank
DRA   Demand-responsive Approach
Dwt   Dead weight tonnage
EAIF  Emerging Africa Infrastructure Fund
ECA   Export Credit Agency
ECN   Energy Commission of Nigeria
ECN   Electricity Corporation of Nigeria
ECOWAS Economic Community of West African States
EECCA East Europe, Caucasus and Central Asia
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EPSRA</td>
<td>Electric Power Sector Reform Act</td>
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<tr>
<td>ESA</td>
<td>External Support Agency</td>
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<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<td>ESMAP</td>
<td>Energy Sector Management Assistance Program</td>
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<td>EU</td>
<td>European Union</td>
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<td>FAAN</td>
<td>Federal Airports Agency of Nigeria</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organisation</td>
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<tr>
<td>FCT</td>
<td>Federal Capital Territory</td>
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<tr>
<td>FTC</td>
<td>Federal Capital Territory Administration</td>
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<tr>
<td>FERMA</td>
<td>Federal Roads and Maintenance Agency</td>
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<tr>
<td>FGN</td>
<td>Federal Government of Nigeria</td>
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<tr>
<td>FME</td>
<td>Federal Ministry of Environment</td>
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<td>FMAWR</td>
<td>Federal Ministry of Agriculture and Water Resources</td>
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<td>FMF</td>
<td>Federal Ministry of Finance</td>
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<tr>
<td>FMP</td>
<td>Federal Ministry of Power</td>
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<tr>
<td>FMST</td>
<td>Federal Ministry of Science and Technology</td>
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<tr>
<td>FMW</td>
<td>Federal Ministry of Works</td>
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<tr>
<td>FMWR</td>
<td>Federal Ministry of Water Resources</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GEF</td>
<td>Global Environmental Fund</td>
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<td>GENCO</td>
<td>Generation Company</td>
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<td>GHG</td>
<td>Greenhouse Gas</td>
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<tr>
<td>GIS</td>
<td>Geographical Information System</td>
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<tr>
<td>GNI</td>
<td>Gross National Income</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<tr>
<td>GSM</td>
<td>Global System for Mobile Communication</td>
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<td>GSMA</td>
<td>GSM Association</td>
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<tr>
<td>GWh</td>
<td>Gigawatt Hours</td>
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<tr>
<td>HJKYBTF</td>
<td>Hadjija-Jama’are-Kamadugu-Yobe Basin Trust Fund</td>
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<td>HPP</td>
<td>Hydro Power Project</td>
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<tr>
<td>HRD</td>
<td>Human Resources Development</td>
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<td>HSDP</td>
<td>Health Systems Development Project</td>
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<tr>
<td>IAEA</td>
<td>International Atomic Energy Agency</td>
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<td>ICA</td>
<td>Investment Climate Assessment</td>
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<td>ICAO</td>
<td>International Civil Aviation Organization</td>
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<td>ICD</td>
<td>Inland Container Depot</td>
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<td>Infrastructure Concession Regulatory Commission</td>
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<td>ICT</td>
<td>Information and Communications Technology</td>
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<td>IDA</td>
<td>International Development Agency</td>
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<tr>
<td>IDB</td>
<td>Inter-American Development Bank</td>
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<td>IEC</td>
<td>Information, Education, Communication</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>IPP</td>
<td>Independent Power Producer</td>
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<tr>
<td>IPSSP</td>
<td>Independent Private Sector Service Provider</td>
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<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
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<td>IUCN</td>
<td>World Conservation Union</td>
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<td>IWRM</td>
<td>Integrated Water Resources Management</td>
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<td>JICA</td>
<td>Japan International Co-operation Agency</td>
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<td>km</td>
<td>Kilometers</td>
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<td>kW</td>
<td>Kilovolt</td>
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<td>kW</td>
<td>Kilowatt</td>
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<td>kWh</td>
<td>Kilowatt hours</td>
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<td>NSC</td>
<td>Nigerian Shippers Council</td>
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<td>NWRI</td>
<td>National Water Resources Institute</td>
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<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
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<tr>
<td>ODA</td>
<td>Official Development Assistance</td>
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<tr>
<td>OPIC</td>
<td>Overseas Private Investment Corporation</td>
</tr>
<tr>
<td>PACP</td>
<td>Presidential Action Committee on Power</td>
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<tr>
<td>PAIDF</td>
<td>Pan-African Infrastructure Development Fund</td>
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<tr>
<td>PCR</td>
<td>Project Completion Report</td>
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<td>PENCOM</td>
<td>National Pension Commission</td>
</tr>
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<td>PHCN</td>
<td>Power Holding Company of Nigeria</td>
</tr>
<tr>
<td>PIM</td>
<td>Project Implementation Manual</td>
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<tr>
<td>PIO</td>
<td>Project Implementation Office</td>
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<tr>
<td>PIU</td>
<td>Project Implementation Unit</td>
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<tr>
<td>Plc</td>
<td>Public Limited Company</td>
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<tr>
<td>PPA</td>
<td>Power Purchase Agreement</td>
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<tr>
<td>Pphpd</td>
<td>Passenger per hour per direction</td>
</tr>
<tr>
<td>PPP</td>
<td>Public Private Partnership</td>
</tr>
<tr>
<td>PTA</td>
<td>Parents- Teachers Association</td>
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<tr>
<td>PTFP</td>
<td>Presidential Task Force on Power</td>
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<td>PV</td>
<td>Photovoltaic</td>
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<tr>
<td>RAMP</td>
<td>Rural Access Mobility Project</td>
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<tr>
<td>RBDA</td>
<td>River Basin Development Authority</td>
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<td>R&amp;D</td>
<td>Research and Development</td>
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<td>Renewable Energy</td>
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<td>Rural Electrification Agency</td>
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<td>Renewable Electricity Action Programme</td>
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<td>RWSSA</td>
<td>Rural Water and Sanitation Agency</td>
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<td>Sanplat</td>
<td>Household Latrine with Sanitary Concrete Slab</td>
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<tr>
<td>SAP</td>
<td>State Action Plan</td>
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<tr>
<td>SEA</td>
<td>Social and Environmental Assessment</td>
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<td>Securities and Exchange Commission</td>
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<td>Statement of Expenditure</td>
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<td>SON</td>
<td>Standard Organization of Nigeria</td>
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<td>SPDC</td>
<td>Shell Petroleum Development Company</td>
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<td>Special Purpose Vehicle</td>
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<td>STWSSP</td>
<td>Small Towns Water Supply and Sanitation Programme</td>
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<td>SWA</td>
<td>Sector Wide Approach</td>
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<td>SWF</td>
<td>Sovereign Wealth Fund</td>
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<td>TA</td>
<td>Technical Assistance</td>
</tr>
<tr>
<td>TCN</td>
<td>Transmission Company of Nigeria</td>
</tr>
<tr>
<td>TEU</td>
<td>Twenty-foot equivalent unit (measure used for capacity in container transport)</td>
</tr>
<tr>
<td>TOT</td>
<td>Training of trainers</td>
</tr>
<tr>
<td>UA</td>
<td>Unit of Account</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>UNIDO</td>
<td>United Nations Industrial Development Organization</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>United States Dollar</td>
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<td>Village Level Operation and Maintenance</td>
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<td>WACS</td>
<td>West Africa Cable System</td>
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<td>WAGP</td>
<td>West Africa Gas Pipelines</td>
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<td>WASCOM</td>
<td>Water and Sanitation Committee (see also WESCOM)</td>
</tr>
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<td>WASH</td>
<td>Water Sanitation and Hygiene</td>
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<td>WES</td>
<td>Water and Environmental Sanitation</td>
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<tr>
<td>WESCOM</td>
<td>Water and Environmental Sanitation Committee (see also WASCQM)</td>
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<td>Water Service Providers</td>
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<td>WSSSRP</td>
<td>Water and Sanitation Sector Reform Programme</td>
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<td>WSS</td>
<td>Water Supply and Sanitation</td>
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<td>WTG</td>
<td>Wind Turbine Generator</td>
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<tr>
<td>ZAR</td>
<td>South African Rand</td>
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</table>
THE NATIONAL CONTEXT

Nigeria has a land mass of 924 thousand square kilometers (km²) and a population of about 167 million as of mid-2012. Nigeria is the most populous country in Africa and the seventh most populated country in the world. Lagos, one of the largest cities in Sub-Saharan Africa, with a population estimated to be over 11.2 million is also the largest urban area in Nigeria.

Nigeria is a federation comprising thirty-six states and one Federal Capital Territory (FCT), which are further sub-divided into 774 Local Government Areas. The aggregate budgetary resources are shared by the three levels of government according to an agreed formula. Since 1999, the share of local government is 20 percent, with state governments receiving 24 percent and the Federal Government the remaining 56 percent.

Nigeria is a major player on the international and African continental scene. Nigeria is the largest shareholder in the African Development Bank. To make an increasingly effective contribution to the economic development of low-income member countries, an agreement establishing the Nigeria Trust Fund (NTF) was signed in 1976 as one of the Special Funds administered by the Bank. In 2008, the Federal Republic of Nigeria and the Bank agreed to a ten-year extension of the NTF. The capital at the end of 2010 was US$ 200 million. It is also a member of the African Union (AU) and a strong actor in the AU Peace and Security Council. Nigeria played the key role in the establishment of ECOWAS and is a strategic force and important member of the organization.

1.1. Nigerian Economy

The Nigeria economy is strong but faces challenges of inequality and inclusion. Nigeria’s GDP is one of the fastest growing in the world. GDP growth in 2013 is expected at 6.5 percent (NBS) or 7.2% (IMF). Exchange rate has stabilized between Naira 155 and Naira 160 over the last two years. The rate of inflation has been decreasing.

The structure of the Nigerian economy is predominantly primary product oriented (agriculture and crude-oil production). In 2011, the oil and gas sector accounted for 79% of revenue collected at federal level and 71% of export revenue. Nigeria’s GDP is estimated to be $375 billion just behind South Africa’s GDP of $390 billion making Nigeria the 30th largest economy in the world from the current 40th. Agriculture which remains very vulnerable to climate change and other factors still account for about 40% of the nation’s GDP and employs about 70% of the labor force despite infrastructure, production and market support services constraints.

In addition to oil and gas, Nigeria is endowed with a wide collection of mineral resources, including coal, bauxite, gold, tin, iron ore, limestone, lead and zinc. To address the high youth unemployment problem, the government has, since 2011, launched the Youth Enterprise with Innovation in Nigeria (YouWiN) Programme designed to encourage youth entrepreneurship and provide grants for small and medium scale enterprises.

Agriculture. Nigeria has a vast area of arable land, diversified ecological zones, abundant water resources and adequate rainfall in most regions of the country, thereby creating favorable conditions for high yield agriculture.

Oil. Oil was discovered in Nigeria in 1953 in the Niger Delta. The Nigerian economy has been dominated by oil since the 1970s. Nigeria gained an additional US$ 390 billion in oil-related fiscal revenue over the period 1971-2005, equivalent to 4.5 times the 2005 GDP of the country. The petroleum sector accounted for a modest 12.7 percent of total GDP by 2012. The Excess Crude Account (ECA) component of External Reserves rose from about $4 billion in May 2011 to around $9 billion at the end of 2012, but now about $6 billion in May 2013.

Oil revenues that accompanied the oil price increases were used to finance a range of ambitious public expenditure programs. Rapid growth in the public sector and a construction boom led to large increases in wages and product prices. At the same time, the Naira experienced substantial apprecia-
tion relative to the US dollar (also as recently in May 2013), that in turn, led to a sharp deterioration in international competitiveness. A system of licenses and quantitative controls was then used to protect domestic industries from foreign competition.

**Poverty.** The World Bank reports that in 2010, 68 percent of the population was below the international poverty line of US$ 1.25 a day. Data released by the NBS indicated that about 69 percent of the Nigerian population are relatively poor as at the end of 2011. The figures released by the NBS also indicated that some 112.52 million Nigerians out of a population figure of 160 million were living below the poverty line during the period under review. State by state analysis revealed that Sokoto had the highest number of poor in the country with 86.4 percent, compared to Niger State which had the lowest poverty rate of 43.6 per cent by end 2010.

### 1.2. Recent Performance

The growth performance of the non-oil economy from the 1960s to the beginning of the last decade was unimpressive. Non-oil GDP grew at an average of only 3.8 percent a year. The poor economic performance during these four decades is attributable to civil war, macroeconomic volatility, unproductive public investment, and institutional and policy constraints that limited the scope for efficiency gains and the productivity of private investment.

Following the return to democracy in 1999, and subsequent actions taken by the Federal Government in 2003 that involved debt restructuring and a broad array of fiscal, financial, infrastructure and institutional reforms, there has been a dramatic improvement in growth performance of the non-oil economy. GDP grew by an average of 6.3 percent a year during 2000-2009, driven by expansion in the non-oil economy of about 8.5 percent a year. The strong performance of the non-oil economy continued in 2010-12, with non-oil GDP expanding by an average of about 8.4 percent a year. By 2012, non-oil GDP stood at about US$ 158 billion, which is roughly comparable to that of New Zealand, the other fast-growing emerging market peers, and well above the growth of some BRICS countries such as Brazil, Russia, India and South Africa. This is due to:

- the expansion in development of the agriculture sector with more arable land being brought into cultivation and productivity (agriculture accounted for about 72 percent of non-oil GDP in 2000, but by 2010 it accounted for 77 percent of non-oil GDP);
- pursuit of strategic structural reforms; and development of the communication, finance and construction sectors.

Notwithstanding the recent economic growth, the level of private investment remained low in the last decade. The average level of total fixed investment in the economy was a low 24 percent of GDP in 2010-11. The level of public investment relative to GDP has averaged about 9.1 percent while private investment averaged about 12.5 percent of GDP despite a sharp increase in the recent years. This is also evidenced by the fact that foreign direct investment (FDI) into Nigeria fell from USD 8.65 billion in 2009 to USD 6.09 billion in 2011 as a result of the global economic crisis and uncertainty over a petroleum industry bill which is perceived as unfavorable.

### Table 1: Trends in Fixed Investments and Net Inflows of Foreign Direct Investment (as annual averages per decade)

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<tr>
<td>Fixed (as % of GDP)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Public</td>
<td>7.7</td>
<td>10.5</td>
<td>9.3</td>
<td>7.2</td>
<td>6.1</td>
</tr>
<tr>
<td>Non-oil</td>
<td>10.6</td>
<td>15.4</td>
<td>15.7</td>
<td>13.9</td>
<td>12.8</td>
</tr>
<tr>
<td>Private</td>
<td>12.5</td>
<td>15.1</td>
<td>14.6</td>
<td>13.9</td>
<td>11.7</td>
</tr>
<tr>
<td>Total</td>
<td>34.4</td>
<td>41.1</td>
<td>39.8</td>
<td>35.2</td>
<td>31.9</td>
</tr>
<tr>
<td>Foreign Direct Investment</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>FDI net inflows (US$ million)</td>
<td>219.2</td>
<td>434.0</td>
<td>1,172.0</td>
<td>4,730.8</td>
<td>7,442.0</td>
</tr>
<tr>
<td>Domestic</td>
<td>1,953.7</td>
<td>4,496.4</td>
<td>3,436.7</td>
<td>1,277.0</td>
<td>8,260.8</td>
</tr>
</tbody>
</table>

Source: Fixed Investment as % of GDP, IMF, various country reports; 2. Oil and gas investment data provided by NNPC and 3. FDI net inflows are those reported by the World Bank Development Indicators database.

Despite the rapid economic growth in the past decade, there has been no reduction in the incidence of poverty in Nigeria. The number of people living below the international poverty line increased from 46 million in 1986 to 108 million by 2010. With an increasing incidence of absolute poverty over the past three decades in combination with a steady increase in average national income per capita in real terms, there has been a substantial increase in income inequality. The Gini Index for income distribution for Nigeria stands at a high level of 54 and has increased by some 10 points in two decades compared to that of Ghana which stands a little over 40 in 2012. Another striking feature of the poverty issue in Nigeria is that poverty rises with distance.
Macroeconomic Management

- To establish macroeconomic resilience, the government has made tremendous efforts to reduce recurrent expenditures to allow for completion of unfinished capital projects. As a result, recurrent expenditures have dropped from 74.4% of total budget in 2011 to 68.7% in 2013. The government has established an “Envelope” system intended to enable Ministries prioritize uncompleted capital projects. Along the same lines, government borrowing is expected to fall from Naira 852 billion in 2011 to Naira billion in 2013.
- Nigeria’s debt to GDP ratio stands at -21% compared to that of that -42.7% for South Africa and -34.2% across the sub-sahara Africa. Trade has also improved remarkably. Imports are down for some key products such as paper making materials and textiles. Non-oil exports have also increased from 9% of total exports in 2008 to 31% in 2012. Oil exports are now 69% of total exports, compared to 91% in 2008.

Public Financial Management Improvements

- To enhance efficient personnel cost planning and budgeting in the national payroll systems, the government instituted the Integrated Payroll and Personnel Information System (IPPIS) in 2012. This system will ensure effective budgeting of payroll costs based on actual verified numbers and not estimates. To improve acquisition, allocation, utilization and conservation of public financial resources, the Government Integrated Financial Management an Information System (GIFMIS) was also introduced for efficiency. It is important to note that 58 percent of the national budget is now executed through GIFMIS. It is expected that about 79% will be executed through GIFMIS by end of third quarter 2013. Although these measures are admirable, it remains to be seen how they can be sustained overtime.
- Nigeria’s credit ratings have also improved. Ratings by international agencies like Fitch, Standard & Poor’s and Moody’s have improved to BB- (or equivalent). Private firms in Nigeria as a result, are able to raise funds abroad. Access Bank for instance, has been able issue a $350 million Euro Bonds. Nigeria has also become a preferred investment destination recording approximately $7 billion of foreign direct investment in 2012.

Sovereign Wealth Fund

Saving for the future has been a policy strongly emphasized by the government. To execute this policy, the Nigerian government established the Sovereign Wealth Fund (SWF) in 2012 to implement a program for putting money aside for emergencies. Incidentally, the SWF has been proposed as a potential financing mechanism or option for addressing the infrastructure deficits in Nigeria in the Infrastructure assessments completed by the African Development Bank.

from the coast. National poverty rates in the coastal areas are typically under 40 percent, but they rise to more than 70 percent in parts of central Nigeria and even more so in the northern parts of the country, a large part of which are landlocked with widespread dilapidated infrastructure.

Table 2: Average Real Growth in GDP and Non-oil GDP of Nigeria (In % [based on GDP] in Naira at 1990 constant prices)

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</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>3.5</td>
<td>8.2</td>
<td>1.6</td>
<td>2.5</td>
<td>6.1</td>
<td>8.0</td>
<td>7.4</td>
<td>6.6</td>
</tr>
<tr>
<td>Non-oil GDP</td>
<td>2.6</td>
<td>5.9</td>
<td>3.4</td>
<td>3.2</td>
<td>8.3</td>
<td>8.5</td>
<td>8.8</td>
<td>7.9</td>
</tr>
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Source: Annex 1 (Main report)

1.3. Outlook

The Outlook for Nigeria is characterized as follows:
- Nigeria’s population of 167 million will reach a total of a little over 200 million people by 2020 with a strong urbanization leading to 56.8 percent of the population living in cities by 2020. Urban population is projected to increase at 4 percent per annum over the period, with growing needs for more infrastructure services.
- Overall GDP is projected to increase between 6.4 percent (World Bank/IMF) and 7.5 percent (NBS) for 2013-15.
- Assuming that the prevailing labor participation rates remain close to current levels, an additional 16million people will enter the labor force over the 2010-2020 period, compared with about 11 million over the 2000-10 period.

The priorities for supporting future growth are:
- Meeting the needs for a major expansion of investment in infrastructure;
- Establishing a stable macroeconomic environment with improved coordination between monetary and fiscal policy;
- Reducing the heavy dependence on oil revenues for government revenues and expenditures;
- Increasing investment in building human capacities and skills in the labor force and;
- Establishing a strong institutional and regulatory framework in support of private sector activities.

The Government vision for the 2011 to 2020 period is articulated in the Nigeria Vision 20:2020 Economic Transformation Blueprint (NPC 2009), and the Transformation Agenda. The underlying medium term strategy for achieving the long-term vi-
sion 20: 2020 objectives are built upon some of the following pillars:

- A gradual shift to a service-based economy and manufacturing, value-addition of agricultural products, agro-processing and beneficiation of natural resources (oil, gas, minerals).
- That the sectoral contribution of agriculture to the GDP, will shrink from the current 41.5 percent (2009) to 34.3 per cent (2013), as more agricultural produce is transformed from their primary state into processed products, with more value-added.
- A reduction in the present level of food import worth over US$3.3 billion per year by 50 percent by 2013.

For the required structural transformation to occur, however, the binding constraints on the agricultural and industrial sectors must be addressed, in particular, the extensive infrastructure bottlenecks that have plagued the country for decades.

The specific objectives of Vision 20:2020 are:

- Achieving double digit growth rates and maintaining strong economic fundamentals;
- Achieving significant progress in economic diversification;
- Stimulating the manufacturing sector and strengthening its linkage to the agricultural and oil and gas sectors;
- Raising the relative competitiveness of the non-oil sector, to increase the demand for Nigeria’s products and services;
- Deepening the financial sector and sustaining its stability to enable it finance the real sector;
- Encouraging massive investments in infrastructure and human capital and creating an enabling environment for domestic and private investment; and
- Adopting pragmatic fiscal management and implementing appropriate monetary, trade and debt management policies to support domestic economic activities.

1.4. Key Issues And Development Constraints

The most significant constraints to achieving the Vision 20:2020 objectives are:

The lack of progress in improving the productivity of private investment in the non-oil economy, observed in agriculture as well as industry and services and the resulting weak performance of the industry sector (growth in agriculture was based on the extension of cultivated areas rather than productivity gains). The performance of the manufacturing and transport sectors has been a serious concern. In 2000, these two sectors accounted for 12.4 percent of non-oil GDP, but by 2010 their share had declined to only 6 percent. The improved growth performance of the non-oil economy since the reforms in the early years of the 2000s is clearly associated with a recovery in non-oil private investment to about 10.7 percent of GDP during 2000-09 and about 15 percent in 2010-11. However, these current levels of private investment in the non-oil economy are still well below the level of private investment equivalent to about 20 percent of GDP that is typical of the world’s high growth developing economies. The challenge for the Government is to create conditions for a further significant increase in public and private investment in the non-oil economy, along with improvements in the productivity of this investment.

The very low participation and opportunities in the labor force for the youth, because the female participation rate has been much lower than in many other lower middle income countries.

The instability of the economy which increases the risk for private investors. The fundamental cause of the macroeconomic instability has primarily been the poor management of national resources, particularly, of the oil revenues. Amidst the volatility of oil revenues, Nigeria’s domestic policies for reform and improving economic governance has not been very effective either in enactment or enforcement. Corruption has instead been widespread, coupled with lack of transparency and accountability. During the three decades from 1970 to 2000, Nigeria’s government spending essentially followed the boom-bust cycles of the world oil market, with periods of excessive spending followed by periods of sustained public under-spending. Other important barriers to economic growth today is the violence and insecurity.

Qualitatively and quantitatively insufficient infrastructure. In the past, public investment in infrastructure has been no more than 9.1 percent of GDP – a level of investment that failed to keep pace with capital replacement costs and that therefore contributed to deterioration of the country’s infrastructure.
AN INFRASTRUCTURE ACTION PLAN FOR NIGERIA
Nigeria has made important progress in improving much of its infrastructure in recent years. Compared to a number of Sub-Saharan countries, Nigeria has relatively advanced power, road, rail and information and communications technology (ICT) networks that cover extensive areas of the country.

Unlike some other countries in the West Africa region, Nigeria has developed infrastructure backbones that have a national reach. However, the condition of the road network is poor and as a result, national connectivity is impaired.

Inadequacies of the mass transportation have encouraged the use of motorcycle for commercial and public transportation. Water transportation has also continued to stagnate along with other systems, even though the country has about 3,300 kilometers of navigable inland waterways. While these ought to provide easy access to the coast from the hinterland, they have not been adequate for navigation due to a lack of dredging and availability of modern vessels. The power transmission grid is national in scope, with most major generation facilities linked to the grid, but the quality of supply is low. There is broad coverage by the mobile communications (GSM), although there are coverage gaps in the northern parts of the country.

Nigeria’s regional infrastructure connections are expanding, but much remains to be done in this regard. Nigeria is connected to the South Atlantic SAT-3, MAIN-1 and Glo-1 submarine cables along the west coast of Africa, but it lacks fiber-optic land links with its neighbors. There are limited points where Nigeria’s national road network intersects with the regional network. These include the east-west coastal routes and a few corridors to the landlocked hinterland countries. In the case of power, there is a long-standing interconnector with Niger, and the West Africa Power Pool (WAPP) line, when completed, will provide connections to Benin and Ghana. However, there are no power interconnections with Cameroon to the east. The West Africa Gas Pipeline links Ghana to Nigeria and allows the export of gas for power stations.

A number of important reforms in infrastructure have been launched in recent years. The ports sector is exploring pragmatic reforms in the transition into landlord models and terminal concessions to attract private investment into the sector. The power sector is undergoing a major restructuring that is paving the way for performance improvements, including a move towards electricity tariffs that recover a larger share of operating costs in the sector. Major liberalization measures in the ICT sector have resulted in widespread, low-cost mobile services, a vibrant fixed line telephony circuit, and major private investments in the development of a national fiber-optic backbone. A strong domestic air transport sector has emerged with a handful of private carriers that have attained regional significance.

This progress notwithstanding, there is widespread agreement that the inadequate physical infrastructure of the country is one of the major constraints to sustained and broad-based strong economic growth. Addressing these challenges will require a substantially larger annual level of investment in infrastructure, a significant increase in annual allocations for routine and periodic maintenance to ensure reliable infrastructure services, and increased attention to the institutional arrangements that support the infrastructure network of the country and the related services. Recent studies suggest that if the infrastructure endowment of Nigeria were raised to that of the Africa region’s middle income countries, it could boost annual GDP growth by about four percentage points. The main reports deals with the issue in much detail.

2.1. Transport

2.1.1. Salient features of Transport Sector in Nigeria

Roads. At independence in 1960, the national road network was about 6,500 km and by 2010, the national road network is estimated to be 197,000 km, about 18 percent of which is paved. The Federal primary road network accounts for 9 percent
of the total, with State managed secondary roads accounting for about 24 percent of the network. The remaining 67 percent are tertiary and village access roads, almost all of which are under the jurisdiction of local governments.

The road network carries at least 90 percent of the internal and cross-border freight of the country. In Lagos for instance, according to LAMATA, there are 222 vehicles to every kilometer which is in excess of the national average pinned at 11 vehicles to every kilometer of pliable road and increasing steadily. About 30,000 km of the total network is located in the urban areas of the country.

The road network in Nigeria is currently estimated to be 197,000 km, about 18% of it paved. This network carries 90 percent or more of the internal and cross-border freight of the country. The major traffic generators are the main towns, state capitals and especially to the sea ports and inland ports. About 30 km of the total network is located in the urban areas of the country.

**Railways**. The network consists of 4,332 track km and 3,505 route km, characterized by sharp curves and steep gradients in many sections. Only 30 km of the track is in the form of double track and all of that is in the Lagos area. The Nigerian Railway network runs diagonally from the Southwest (Lagos) to Northeast (Nguru) and from the South-East (Port Harcourt) through Kafanchan to the North-East (Maiduguri). The 3,505 km network is built on a Cape Gauge of 1,067 mm.

All trains are operated with diesel locomotives. The national railways company, NRC, owns nearly 200 locomotives, including 54 shunt locomotives. More than 75 percent of these locomotives were not operational in 2009. There are also about 480 passenger coaches and over 4,900 freight wagons. Less than 50 percent of the coaches and wagons were in serviceable condition in 2007.

**Inland Ports**. Nigeria has substantial domestic water resources that include rivers, creeks, lagoons and lakes, and an extensive coastline of about 853 km. There are 12 major inland rivers with about 3,800 km that are navigable. The Niger River and to a far lesser extent the Benue River (including its major tributaries and estuaries) are the principal waterways. These waterways are the major transportation routes linking Apapa, Tin Can, Warri, Port Harcourt, Onne and Calabar seaports.

**Air Transport**. Nigeria has four international hubs (Lagos, Abuja, Kano, Enugu and Port Harcourt) and 20 domestic airports that are owned and operated by the Federal Airports Authority of Nigeria (FAAN). There are 62 private airstrips throughout the country, 34 of which have paved runways. The four international airports offer scheduled flights to US, Asia, the Middle East and some European hub destinations (London, Frankfurt, Amsterdam, Paris), but are only connected to few African capitals (there are connections between Lagos, Abuja, Accra and Addis Ababa).

**Pipeline for Transport of Natural Gas**. As of 2007, the Nigerian network included 3,071 km of pipelines that carry natural (dry) gas, 124 km that carry condensates (wet gas) and 156 km of pipelines that carry LPG. The existing gas transportation pipelines, gas processing facilities and other associated infrastructure are currently owned by individual upstream gas producers and are dedicated to their respective operations. The Nigerian Gas Company (NGC) owns and operates 1,100 km of gas pipelines with a capacity of more than 2.5 billion cf per day. The network includes the Alakiri-Obigbo-IkotAbasi Pipeline (Eastern network); and the Escravos-Lagos Pipeline System (ELPS) (Western network), which feeds the commercial nerve-centre of the nation, and fuels the main power station at Egbin, near Lagos. There is also a dedicated pipeline infrastructure owned by the NLNG and the NNPC/SPDC/Total joint venture.
Urban Transport. The number of large buses in Lagos is small in relation to the other African cities, whereas the minibus fleet in Lagos, Johannesburg, and Nairobi are roughly comparable after adjusting for the population size of each city. Minibuses and shared taxis also account for a large share of the passenger movement. Taken together, these two modes account for 77 percent of passenger traffic in Lagos, compared to 68 percent in Nairobi, 56 percent in Johannesburg, and 52 percent in Abidjan. The share of passenger traffic accounted for by large buses is a low of 2 percent in Lagos compared to 13 percent in Abidjan. A striking comparison is the number of seats per 1,000 persons for private cars, large buses and minibuses. In the case of Lagos there are only three large bus seats per 1,000 persons – much lower than in comparable cities – but there are 137 minibus seats per 1,000 persons – the highest among comparable cities.

2.1.2. Performance of the Transport Sector

Roads. Nigeria has a road density of 0.21 km of road per square km of land area, which compares well with an average of 0.06 km per sq. km. for the West and Central Africa regions combined. The road density for Nigeria is roughly the same as that for South Africa, Mexico, Brazil, Indonesia, and Pakistan.
The main issue is that the quality and quantity of road service are inadequate due to lack of maintenance which has led to the dilapidated state of road networks. Significant portions of the road network are in poor condition, subjecting the process to capacity constraints, with a poor road safety record and weak traffic and safety law enforcement. Banditry and criminal activity on the roads are rampant. It is estimated that 40 percent of the Federal primary road network is in poor condition or worse, and therefore in need of rehabilitation; 30 percent is in fair condition and in need of periodic maintenance; and about 27 percent is in good condition. The most recent data about the condition of state and local government roads dates back to 2003. At that time, the state and local government network was about 160,080 km of secondary and tertiary roads, 85 percent of which was in poor condition or worse and 6 percent was in good condition.

Rural Roads. Most recent data show that about 47 percent of rural inhabitants live within two kilometers of an all-season road, which is well above the average of 34 percent for Sub-Saharan African countries.

Urban Roads. The road network in Nigeria is currently estimated to be 197,000 km, about 18% of it paved. This network carries 90 percent or more of the internal and cross-border freight of the country. The major traffic generators are the main towns, state capitals and especially to the sea ports and inland ports. About 30 km of the total network is located in the urban areas of the country.

Road Transport. In 2010 the vehicle fleet was estimated to consist of about 5.2 million four-wheel vehicles and 5.3 million two-wheelers. The fleet grew by about 10 percent a year in the past decade. Nevertheless, in 2007 there were only 31 four-wheel vehicles per thousand persons in Nigeria, which is low compared with 79 for Indonesia, 165 for South Africa and an average of 270 for Brazil, Mexico and Russia. At present, the road transport industries in Nigeria are characterized by large numbers of small-scale operators of goods and passenger vehicles. A regulatory framework exists for vehicle registration, although reporting of vehicle registration by individual state government appears to be incomplete.

Railways. The Nigerian railway system has suffered a long-term decline as a result of competition from road transport which has eroded the rail traffic base and neglect by the government. The Nigerian rail system has deteriorated and now
the government has embarked on some upgrades. The western line, Lagos – Kano, a 1,224 km line has been completed and now functional. The Eastern line; Port Harcourt – Maiduguri line is expected to be completed by 2013. The Itakpe – Ajaokuta – Warri standard gauge rail line is now reported to be 77% complete. In addition, some 25 new locomotives are reported to have been procured. Some additional 200 coaches and wagons are reported to have been refurbished. As a result, available data shows that the number of passengers carried by the rail system has risen significantly, from about 1 million in 2009 to about 4.2 million in 2012.

accounts for less than 1 percent of transport services in the country. The rolling stock of the Nigerian Railways Corporation (NRC) is also in very poor condition, with most locomotives, wagons, and carriage out of service because of lack of parts and servicing.

Rail passengers declined from 15 million in the mid-1980s to about 1.5 million by 2000 and most likely about one million in 2007. Freight traffic declined from a high of three million tons in the mid-1960s to 117 thousand tons in 2000. The amount of freight carried by the railways in 2000 was equivalent to only 0.4 percent of the throughput of the ports in 2000 and less than 0.1 percent of the throughput in 2010. The amount of freight carried had declined due to deterioration of the level of service and competition from road transport and the poor condition of the infrastructure and rolling stock. Since then, freight and passenger services have almost ceased to exist.

The Nigerian rail network continues to operate essentially with much of its original facilities. Many structures and some of the track work are now over 100 years old. The declining quality of railway assets and train services has also led to the disappearance of intermodal transport nodes and further decline in traffic volumes. The situation has been exacerbated by management weaknesses and institutional arrangements in the railway system. The railways are a serious drain on government resources, while currently failing to provide a useful economic function. However, recognizing the importance that the rail system brings to the health of the transport sector,

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Population</th>
<th>Area sq. km</th>
<th>Total rail route (km)</th>
<th>Passenger-km (millions)</th>
<th>Freight ton-km (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>2000</td>
<td>10,448</td>
<td>107,220</td>
<td>2,310</td>
<td>1,290</td>
<td>270</td>
</tr>
<tr>
<td>Brazil</td>
<td>2000</td>
<td>195,435</td>
<td>8,568</td>
<td>15,943</td>
<td>634,388</td>
<td>1,642,930</td>
</tr>
<tr>
<td>Mexico</td>
<td>2000</td>
<td>114,038</td>
<td>763,600</td>
<td>16,422</td>
<td>758,932</td>
<td>3,249,955</td>
</tr>
<tr>
<td>Nigeria</td>
<td>2000</td>
<td>148,851</td>
<td>1,550,016</td>
<td>31,327</td>
<td>1,560,200</td>
<td>9,240</td>
</tr>
<tr>
<td>South Africa</td>
<td>2000</td>
<td>48,793</td>
<td>1,247,090</td>
<td>33,010</td>
<td>1,554,200</td>
<td>11,617</td>
</tr>
<tr>
<td>Vietnam</td>
<td>2000</td>
<td>47,120</td>
<td>792,000</td>
<td>3,762</td>
<td>24,715</td>
<td>6,287</td>
</tr>
</tbody>
</table>

Source: World Bank (2011), 2011 World Development Indicators

Ports. As of 2006, the performance of Nigeria’s major ports was poor by any standards. Nigeria’s rating for the Quality of Port Infrastructure Index of the World Economic Forum was 3.3 in 2011, compared to 4.7 for South Africa and 3.6 for Indonesia. The only comparator with a lower rating was Brazil. In 2006 general-cargo crane productivity was 8-9 tons per hour compared to 30 tons per hour internationally. For container crane productivity, the figure for Apapa port was 12 moves per hour compared to 25-30 moves per hour internationally. The global benchmark for container dwell time was about seven
days in 2006, compared with 30 to 40 days in major Nigerian ports. And for truck cycle time, global best practice is of the order of one hour, compared with about one day in the major Nigerian ports. For many years, Nigeria’s port system was an impediment to economic development. Comprehensive reform of the port sector began in 2000. The reform program was designed to remove the main impediments to efficient operation and thereby facilitate streamlining of import and export activities. The measures adopted included a shift of management toward the landlord port model and the extensive award of private sector concessions for port-based cargo-handling facilities. In conjunction with these reforms, a comprehensive program of concessions for key cargo terminals, including container-terminal facilities, was implemented. In all, 25 concessions were awarded among the 11 ports under the control of NPA in the mid-2000s.

**Inland Ports.** Only very limited use is made of the Nigerian waterways for transport of passengers and cargo. Before 1960, river barges transported between 100,000 and 200,000 tons of cargo annually, and in the 1990s up to 125,000 tons of construction materials were carried annually between Warri and Ajaokuta. At the present time, only 1 percent of the total cargo of Nigeria’s ports is transported along the Bight of Benin where inland waterways are the only available mode of transport.

**Air Transport.** The Nigerian Aviation Industry has experienced steady growth in the past decade.

The total number of domestic and international passenger arrivals and departures increased from 9.4 million in 2004 to 14.8 million in 2011 — an average annual growth of 8.3 percent. Domestic passengers accounted for about three quarters of the traffic in this period. Only the three largest international airports (Lagos, Abuja, Port Harcourt) have significant prospects for revenue generation and are able to cover operating costs. The remaining 18 airports managed by FAAN apparently have substantial operating losses and require Federal Government subsidies. Apparently, none of the airports is in a position to contribute to the funding of their capital expenditure programs.

The most recent 2012-2013 Global Competitiveness Report of the World Economic Forum ranked the quality of Nigeria’s aviation infrastructure at 100 out of 144 countries. Navigational aids and air traffic control facilities have until recently been inadequate but benefitted from a major upgrading programme. Most regional airports lack appropriate apron lighting facilities and thus limit aircraft and airport utilization to 12 hours daily. The issue of aviation safety is a major concern in Nigeria. Nigeria rated 23rd on Aviation Safety Network’s list of the 25 geographical regions having the highest number of fatal civil airliner accidents from 1945 to present. Audits revealed several deficiencies in air safety, including: (i) inappropriate technical security regulations; (ii) limited expertise of technical staff; (iii) profusion of airlines with poorly maintained aircraft; and (iv) sector financing difficulties.

Nigeria had its worst air traffic accident between 2005 and 2006 (Bellview Airlines). As a result of the large restructuring of the domestic airline industry in Nigeria in the past decade, there has been a decline in the number of aircraft in service and a substantial decline in the average number of available seats per aircraft as a result of a shift to smaller aircraft by the current carriers. In addition, the average age of aircraft fleet and the number has declined significantly since 2007. Experts argue that given the current challenges of airport infrastructure, this situation should allow for better management and safety performance of current operations at the nations’ airports.

**Pipelines for Transport of Natural Gas.** The Gas Master Plan Infrastructure Blueprint includes a network of gas hubs which will consist of secondary gas gathering facilities from designated nodes of the upstream gas producers to a network of gas processing facilities where gas will be processed to a national specification and evacuated via transmission pipelines. With full implementation of the Gas Infrastructure Blue Print, it is expected
that most transportation pipelines will be interconnected. Under this framework, transportation pipelines from the well heads to the designated nodes will be owned and operated by the gas producers while pipelines for the transportation of gas from the designated nodes to the transmission pipelines will be owned and operated by the hub operator.

Rampant pipeline vandalism also poses a major challenge to the gas infrastructure. The Transmission Corporation of Nigeria (TCN) reported recently that, sudden losses in power of about 1,598 megawatts in certain regions of the country was due to gas shortages resulting from the vandalism of two major gas pipelines supplying gas to eight power plants in the country.

Urban Transport. A number of problems have emerged in the Nigerian urban transport system, including: bad roads, inadequate fleets of buses and trucks, irregular, inadequate and overcrowded trains and airplanes, and congested ports. Moreover, there are increasingly serious institutional issues, including a dearth of suitably-trained transport managers and planners, serious issues of institutional coordination, and ineffective regulation of traffic.

Given that an increasingly large majority of Nigerians are expected to be living in urban areas by 2020, it is imperative that measures be conceived and applied to anticipate this major urban mobility challenge.

Nigerian megacities like Port Harcourt, Kano, Lagos, and Kaduna are characterized by high growth rates driven by in-migration and natural growth, much of which occurs in informal settlements not served by the formal base of infrastructure and services. The rapid urbanization of Lagos metropolitan area, combined with inadequate or poorly executed development plans, has given rise to numerous transportation problems: these include increasing traffic congestion; worsening state of disrepair of roads; absence of parks, walkways and public spaces; deterioration in physical attractiveness and comfort of road-based public transport; rising levels of road accidents; increasing rates of traffic-related emission and atmospheric pollution; and the growing menace of “Okada” (motorcycle taxis) transporters and “area boys” (thugs and pick-pockets).

The key issues affecting the strategic development of the urban transport system in Nigerian cities are as follows:

- About 95 percent of urban trips are by road, of which about 70 percent are made by public transport. Private operators dominate the public transport system with the use of taxis, unregistered fare paying cars, minibuses, and two- and three-wheeled motorcycles.
- Inter-modality of trips is limited. Most city travelers have limited options of traveling by rail (light, metro, or tram) or by ferry from metropolitan locations.
- Ownership and organization of public road transport systems are characterized by haphazard and uncoordinated operation.
- There is an absence of comprehensive and integrated urban mass transit public transportation system, along with a proliferation of largely uncoordinated private operators.

2.1.3. Issues to be Addressed

Roads. Lack of maintenance has been the most important factor contributing to the deterioration of the road infrastructure of the country. Other factors, such as lack of enforcement of axle loads for roads and bridges, have also accelerated the deterioration in the quality of the infrastructure. In addition, the large volume of heavy duty trucks plying the highways with heavy and bulky loads have also contributed to the bad shape of the roads.

It is clear that the need for substantially larger allocations of public funding for the maintenance of the road network is one of the major challenges in the decade ahead. The Federal Roads Maintenance Agency (FERMA) is responsible for maintenance of the Federal road network. Its resources are derived from the Federal budget. Current estimates of costs per km for appropriate levels of routine and periodic maintenance suggest that if the entire Federal road networks were in good condition and therefore subject only to routine and periodic maintenance, the annual budget requirement would be about US$ 1.7 billion for routine maintenance and US$ 1.2 billion for periodic maintenance. Current levels of spending on maintenance of the Federal network are a little more than 10 percent of these requirements. Upto-date information on the current levels of spending on maintenance by state and local governments is not available, but the analysis undertaken for this
Report suggests that if the entire network of state and local government roads were in good condition, the annual routine and periodic maintenance requirements would be about US$ 200 million and US$ 550 million respectively.

The other major concern related to road infrastructure is that the rural road network falls well short of what is needed to service the rural economy. Many rural areas with high agricultural potential, abundant natural resources and a variety of rural enterprises do not have ready access to markets because of inadequate transport facilities and services. As noted earlier, agriculture accounts for more than 50 percent of Nigeria’s non-oil GDP, with much of the production coming from small-scale family farming. Access to farm inputs and product markets at reasonable cost is key to improved farm production and productivity.

**Road Transport.** The existing fleet is characterized by a preponderance of old vehicles that result in high vehicle operating costs and excessive levels of pollution in urban areas.

Four specific concerns related to regulation of the road transport industry stand out:
- Road design standards have not kept pace with increasing traffic volumes and vehicle weights and poor axle load control that is causing significant damage to the existing road network.
- A lack of road markings, safety barriers, and signage that are contributing to the high accident and casualty rate on all roads.
- Administrative and other bottlenecks on transport routes and at border crossings that slow the movement of goods and people and raise transport costs.

**Railways.** The average railway network traffic density for NRC in 2007 was about 250 traffic units per million route-km for both passenger and freight traffic, compared with 725 traffic units in the early 1990s. NRC’s current performance is among the worst in Africa. SETRAG concessions in Gabon have achieved a ratio of 3,000, Camrail (in Cameroon) 1,400 and the state-owned Transnamib (in Namibia) 700.

The Global Economic Forum (GEF) ranks Nigeria’s quality of rail transport infrastructure at 95 out of 144 countries studied. Rebuilding the network so that rail services are commercially viable will be a major challenge for the country.

**Ports.** Despite significant progress since 2000, much remains to be done to improve the productivity of Nigeria’s main ports. Action is also needed to address continuing problems of poor customs performance at these ports, improve both the marine and landside access to ports, and plan for new capacity infrastructure.

**Inland Ports.** The National Transport Policy statement of 2010 drew attention to the following problems that must be addressed if inland water transport is to play a significant role in the decade ahead: (i) a high rate of sediment build up along navigable channels; (ii) physical obstruction, including wrecks, rocks, outcrops and aquatic weeds; (iii) inadequate government investment in infrastructure for inland water transport, including inadequate river port infrastructure; (iv) poor landside connections to river ports; and (v) poor communications and navigational aids.

**Air Transport.** The airline industry is likely to continue to evolve in the coming years. The smaller carriers, for example, are undercapitalized and face difficulties in mobilizing credit. A general problem in the aviation industry in Nigeria is the availability of skilled labour. A more bigger challenge is the lack of infrastructure such as modern navigational aids, runways, and adequate airport facilities such as warehousing and storage houses, that can promote operation of increased commerce and use of bigger aircrafts in the identified airports in the country. The pool of aviation-related skilled labor is composed of an ageing workforce in the public sector and by a brain drain as highly skilled Nigerians find work opportunities outside the country or with large international carriers, especially the Gulf airlines.

A more bigger challenge is the lack of infrastructure such as modern navigational aids, runways, and adequate airport facilities such as warehousing and storage houses, that can promote operation of increased commerce and use of bigger aircrafts in the identified airports in the country.

**Pipeline for Transport of Natural Gas.** For the most part, natural gas reserves have been discovered in Nigeria as a byproduct of oil exploration.
and development. Nigeria’s oilfields have lacked the infrastructure to produce and market associated natural gas, and as a result much of it has been flared. In 1980, 90 percent of gas produced was flared, and in 1990, 77 percent was flared. For some years now the policy of the government has been to stop gas flaring through the use of incentives and stiff penalties for gas flared. As a result, the quantity of flared gas declined to less than 50 percent of gas production by 2000. There is still a considerable mismatch between robust investments for export-oriented gas projects such as LNG, GTL, or the West African Gas Pipelines (WAGP) and weak infrastructure investment to develop natural gas required for electric power generation and gas as feedstock for the industrial sector of the local economy.

Urban Transport. There is an increasingly clear understanding within Nigeria that sustainable improvements in urban mobility cannot take place without the implementation of proactive policies in favor of public transport development.

The main problems associated with the passenger - bus operator business groups in Nigerian cities are as follows: (i) low level of service in terms of speed and reliability; (ii) buses are old and unsafe for passengers; (iii) fares are relatively high for single trips with no seasonal or multi-trip ticket options and without subsidies given to disadvantaged population groups; (iv) poorly organized bus parks that create major traffic congestion along main road corridors; (v) no common ticketing system to enable transparent transfers from one bus to another; (vi) no basic passenger information system exists regarding route, schedule, fares and transfer options; and (vii) no priority measures for buses exist.

Many of the observed shortcomings in the urban transportation system in Nigeria stem from sector management weaknesses. Nigeria is characterized by the absence of a planned and effectively integrated multi-modal transport system that incorporates rail and water transport, where applicable, to complement road transport on which there is over-dependence. There does not appear to be a well-articulated policy and strategic framework for the urban transport sector.

Institutional responsibilities for urban transport development and service provision among various agencies are fragmented at the three levels of government with no coordinating framework. Two Federal Ministries and one Commission are currently involved in the planning and implementation of urban transport sector projects at Federal Government level: the National Planning Commission (NPC) which has responsibilities for all sectors; the Federal Ministry of Works (FMW) which is responsible for the Federal Road Transport sub-sectors; and the Federal Capital Territory Administration (FCTA) which is responsible for the urban and rural roads sub-sectors within the FCT.

2.2. Energy

Turbine and Generator House for the Jebba Hydro-Electric Power Station

2.2.1. Salient features of the Energy Sector in Nigeria

Generation. The total installed capacity of the government-owned plants is 6,978 MW, but available capacity in 2010 stood at about 3,360 MW – equivalent to only about 48 percent of installed capacity. This has marginally improved to about 4,300 MW peak in 2012. The facilities currently owned by the Federal Government include three hydropower plants with an installed capacity of 1,900 MW, one oil-fired plant with a capacity of 60 MW, one coal-fired plant with a capacity of 30 MW, but which is no longer in operation, and seven gas-fired thermal plants with an installed capacity of 4,988 MW. The total installed capacity of the 11 on-grid private generation facilities that were operational at the beginning of 2012 is 2,314 MW. The total installed capacity was about 9,384 MW at the end 2011. Total available installed capacity declined from 5,880 MW in 2009, to 5,550 MW in 2010 and 5,400 MW in 2011, far less than the estimated demand of 10,000-12,000 MW. The result is frequent and unpredictable load shedding, so much so that those who can afford
Current available electricity generation capacity is nearly 50 percent below estimated power demand. The country’s installed capacity in 2011 was 64 megawatts per million people compared to 800 MW per million people in Africa’s middle-income group of countries.

Informal estimates of consumption from self-generation by industry and households using diesel and petrol generators suggest that the capacity of these self-generation facilities could match or even exceed the existing capacity of the public and licensed private generation facilities: estimates range from 4,000 to 8,000 MW.

Transmission. As of the end of 2009, the transmission network for Nigeria consisted of the following facilities:

- 5,524 km of 330 kV transmission line and 6,802 km of 132 kV lines.
- Thirty-two 330/132kV substations with total installed transformation capacity of 7,688 mega-volt ampere (MVA) – equivalent to 6,535 MW.

Recent data suggest that the available capacity was 96 percent of installed capacity. Average technical losses associated with transmission were estimated to be 8.5 percent. However, much of the transmission equipment is outdated, with many of the facilities being 30-40 years old.

Distribution. Distribution of electricity has been the responsibility of 11 state-owned distribution companies (DISTCOs). As of end 2009, the network consisted of the following facilities:

- 37,173 km of 33kV lines, 29,055 km of 11kV lines and 70,799 km of 0.415 kV lines.
- One hundred and five 132/33/11kV substations with total installed transformation capacity of 9,130 MVA – equivalent to 7,761 MW.

Access. There are a number of informal estimates for household access to electricity. The 2006 household survey indicates that electricity was the main lighting fuel for 37.3 percent of households, which suggests that about 9.8 million households had access to electricity at that time. More recently, the Nigeria Vision 20:2020 indicates that 40 percent of households had access to electricity in 2009.

### 2.2.2. Performance

All available statistics paint a dismal picture of the electric power sector in Nigeria. Power consumption per capita in Nigeria is the lowest among all eight of the comparator countries, including Bangladesh and Pakistan.

#### Table 4: Selected Indicators for Infrastructure Comparator Countries (Most recent)

<table>
<thead>
<tr>
<th>Country</th>
<th>Roads per sq km</th>
<th>Quality of port infrastructure WEF index (1-7)</th>
<th>Power Consumption kWh/capita</th>
<th>Access to water (%)</th>
<th>Access to sanitation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>2.31</td>
<td>5.2</td>
<td>8,194</td>
<td>100</td>
<td>8.0</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.21</td>
<td>2.7</td>
<td>2,364</td>
<td>98</td>
<td>78</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.56</td>
<td>3.9</td>
<td>2,942</td>
<td>97</td>
<td>40</td>
</tr>
<tr>
<td>Morocco</td>
<td>2.39</td>
<td>4.0</td>
<td>5,390</td>
<td>106</td>
<td>86</td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.24</td>
<td>3.9</td>
<td>2,093</td>
<td>82</td>
<td>54</td>
</tr>
<tr>
<td>South Africa</td>
<td>2.30</td>
<td>4.3</td>
<td>4,103</td>
<td>93</td>
<td>49</td>
</tr>
<tr>
<td>Nigeria</td>
<td>0.23</td>
<td>3.8</td>
<td>176</td>
<td>99</td>
<td>25</td>
</tr>
<tr>
<td>Pakistan</td>
<td>0.18</td>
<td>4.1</td>
<td>917</td>
<td>91</td>
<td>40</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.16</td>
<td>3.4</td>
<td>227</td>
<td>99</td>
<td>56</td>
</tr>
</tbody>
</table>

The economic impact of Nigeria’s power deficit is substantial. According to enterprise surveys, Nigeria is affected by power outages more than 320 days a year, a level many times higher than that found in other African countries. The economic and financial costs of these power sector shortfalls are substantial. Some 96 percent of firms surveyed for the Nigeria Investment Climate Assessment Report (ICA) indicated that they experienced power outages that averaged 196 hours per month or eight days per month. About 9 percent of sales are lost annually due to electricity outages. As a result, some 86 percent of firms own generation units, usually diesel fuelled, which provide about 61 percent of their electricity needs.

Current available electricity generation capacity is nearly 50 percent below estimated power demand. The impact of the electricity supply gap on people’s lives is real, so much so that the performance of government is now measured by perceptions about progress in improving the availability of electricity.

Consumption by households grew by an average of 10 percent a year during 2000-2010, with consumption by industry and other consumer groups increasing by about 8 percent a year in the same period. In recent years, households have accounted for about 55 percent of total consumption, with industry and other users accounting for 42 percent. Self-consumption by the power sector accounted for the remaining 3 percent.

Informal estimates suggest that about 15 percent of the rural population had access to some form of
electricity as well as about 55 percent of the urban population.

Failure to pay bills and non-technical losses (which stem mainly from illegal connections) account for 25 percent of the total losses sustained by DISTCOs in 2010. The introduction of prepaid energy meters is expected to help with revenue collection.

2.2.3. Issues to be Addressed

There is no doubt that there are sufficient domestic resources to meet the power needs of the nation. These resources include oil and gas, coal, substantial hydropower capacity and other forms of renewable resources. The exploitation and utilization of these resources have been hampered, like other aspects of national development, by the grossly inadequate indigenous technical capacity and poor governance in the sector and lack of long range planning.

Renewable energy is marginal in the energy mix. The barriers to the development of renewable electricity are: (i) policy and regulatory issues; (ii) issues related to investment and financing arrangements; (iii) technological obstacles; (iv) issues related to public awareness; (v) lack of technical standards and quality control; (vi) intermittent availability of these energy sources and inadequate resource assessments.

The main cause of Nigeria’s inadequate power supply is a lack of investment in the sector by a succession of governments over the past 25 years.

Faced with the challenge of providing electricity and thus improving the economy with all its concomitant social and economic benefits, governments since 1999 have initiated a number of interventions, many of which until recently, have failed in implementation due to inadequate planning and the absence of crucial technical support.

The Nigeria Vision 20:2020 report sets out clearly the main challenges facing the power sector:

- An inadequate power generation capacity.
- Insufficient supply of fuel for thermal power stations.
- Issues related to the choice of technologies for power generation.
- An overloaded transmission and distribution network, including obsolete and inefficient equipment, lack of modern control systems for management of power supply, and widespread theft of equipment.
- Weaknesses in the institutional and regulatory framework and lack of detailed assessments related to future demand for power.
- Inadequate framework and operating environment for private investment in the power sector.
- Inadequate pricing policies for electric power coupled with weak capacities for billing and revenue collection making the sector fundamentally non sustainable financially.
- Capacity constraints with respect to the skills of the power sector workforce.

Addressing the tariff and revenue collection is a top

<p>| Table 5. Composition of Electricity Consumption in (GWh) |
|---------------------------------|-----------------|</p>
<table>
<thead>
<tr>
<th>Consumer category</th>
<th>Annual Consumption (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Consumption</td>
<td>Annual Consumption (GWh)</td>
</tr>
<tr>
<td>Industrial electricity</td>
<td>6.44</td>
</tr>
<tr>
<td>Urban sector electricity</td>
<td>9.54</td>
</tr>
<tr>
<td>Export</td>
<td>2.58</td>
</tr>
<tr>
<td>Total Consumption</td>
<td>18.56</td>
</tr>
<tr>
<td>Market times Consumption per capita</td>
<td>174.7</td>
</tr>
</tbody>
</table>

Source: For 2000-2010, (UN Energy Statistics database and CIA World Fact Book. For 2011, estimates by authors. Population data from Annex Table 1.6 of main report are to be used to calculate consumption per capita.

"Spaghetti" power distribution line

The power sector has also been characterized by a high degree of operational inefficiency and under-pricing. As of 2005, only 64 percent of billed revenues were collected. Distribution losses were as high as 30 percent, compared to best practice levels of 10 percent. Tariffs covered about 28 percent of the costs of power supply. In 2005, Nigeria’s residential power tariff was around US$0.03/kWh – among the lowest in Africa – and well below the average of US$0.16/kWh found in African countries predominantly reliant on thermal generation technologies.
priority for the power sector, in order to mobilize the resources necessary to improve its performance, improve the quality of service, increase electricity access rate in Nigeria and meet the future demand that will be generated by the ambitious growth prospects under Vision 20:2020.

While substantial hidden costs are typical of African power utilities, the scale of the problem in Nigeria is much larger than anywhere else. In response to these increasingly severe problems, the Federal Government launched a major effort in the latter part of the 2000s to reform the power sector. The reforms led to the horizontal and vertical unbundling of the national power utility into six generating companies, one transmission company, and eleven distribution companies. In August 2010, the Federal Government issued the Road Map for Power Sector Reform. The strategy recommended removing obstacles to a major role for the private sector in both power generation and transmission and distribution in Nigeria in the decade ahead. The reforms led to the horizontal and vertical unbundling of the national power utility into six generating companies, one transmission company, and eleven distribution companies. 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Sanitation. Over the past two decades there has been a steady decline in the share of the urban and rural populations in Nigeria with access to improved sanitation. The FAO estimates that 2,076 million hectares are suitable for irrigation, however, only 10 percent of this potential area is actually under irrigation, and only 14 percent of the area (about 300,000 hectares) is equipped for irrigation, which is less than 1 percent of the cultivated land in Nigeria.

Water Supply. Performance in providing the populace with access to improved water has been disappointing. Of particular concern is the poor performance with respect to access to utility water. Nigeria is well short of meeting its Millennium Development Goal (MDG) of providing 75 percent of the population with access to improved water by 2015. Given that about 93 million people (27 percent of the population) had access to improved water in 2010, achieving the MDG target would require that an additional 87 million people gain access to improved water during 2011-2015 – a highly unlikely outcome.

Sanitation. Over the past two decades there has been a steady decline in the share of the urban and rural populations in Nigeria with access to improved sanitation. With only 31 percent of the population having access to improved sanitation in 2010, the implication is that almost 110 million people in Nigeria did not have access to improved sanitation. As a result of low access to improved sanitation, the mortality rate due to poor sanitation is high, with reports that 5 to 20 percent of deaths result from water-borne diseases such as diarrhea, cholera, typhoid, guinea worm and bilharzia. Access to improved sanitation in Nigeria is substantially lower than in any comparable countries.

2.3.3. Issues to be Addressed

Irrigation. Virtually all of Nigeria’s dams are underutilized, with only 73 percent of total capacity in active use. The dam storage capacity needs to be increased with a volume of 250 m3 per capita. This is low compared with an estimate of about 838 m3 for Sub-Saharan Africa as a whole.

Public sector irrigation schemes have performed poorly for a number of reasons, and as a result there has been substantial deterioration in the facilities. Many are now in urgent need of renovation. Private sector investment which account for more than 80 percent of the area that is irrigated is substantially affected by the poor performance of the irrigation system.

Water Supply. A major concern relates to the mismatch between the revenues collected for water services and the costs of service. Most of the state water boards in Nigeria have low annual revenues that stem from low prices charged for water services and large amounts of revenues that are not collected. Revenue collection is as low as 10 percent of the amounts payable in some cases. Moreover, many boards have substantially inflated operating costs, in part due to overstaffing, and depend on unpredictable state budget allocations.

Sanitation. The key issue to be addressed is the low rate of access to improved sanitation. For successful implementation of a major program for expansion of access, a wide range of issues related to the design and implementation will have to be addressed, including: (i) the lack of mechanisms for public interventions that support the policy, leaving households with the sole responsibility for acquiring the facilities required for improved access to sanitation; (ii) widespread rural poverty which makes it difficult for individual rural homes to implement this policy; (iii) insufficient capacity at all levels of government related to the design and implementation of programs that can meet the ambitious targets for improved access; and (iv) lack of mechanisms that support the entry of private entrepreneurs into services related to provision of improved sanitation.
2.4. ICT

2.4.1. Salient Features of the ICT Sector in Nigeria

The total number of users of the internet, and mobile and fixed line phones has increased from about 660,000 in 2000 to almost 143 million in 2011. The percentage of the population living within range of a GSM signal has expanded rapidly, reaching 60 percent in 2006 and nearly 70 percent by 2009. Practically all urban areas are fully covered and about half of the rural population is within reach of a signal. According to World Bank data, private sector investment in communications facilities amounted to about US$3.4 billion during 2005-10, with much larger amounts spent on operations and maintenance of the networks. One of the distinguishing features on the Nigerian telecommunications network is that it has no competitive fixed line sector. Market liberalization policies of the Government have resulted in entry of 30 active, fixed-wireless operators as of end 2009.

2.4.2. Performance

Nigeria has made substantial progress in the development of ICT infrastructure. In particular, it has successfully developed a national fiber-optic network. Unlike many other African countries that are developing these networks as publicly-owned facilities, Nigeria has liberalized the market for fiber-optic infrastructure. As a result, there has been substantial private investment in this infrastructure. The country now has a fiber-optic network that connects the major cities of the country. However, it is very unlikely that the private sector will extend the network to small urban and rural communities.

Despite spectacular development over the last decade, a deep digital divide continues to separate Nigeria from more advanced economies in the world. Nigeria ranked a low 13th among the 29 Sub-Saharan Africa countries included in a recent survey. The divide is especially deep in terms of the quality of ICT-related infrastructure, affordability of ICT and the availability of ICT-related skills. With mobile telephony subscriptions of 55 per 100 persons, Nigeria ranks 122 among the 142 countries surveyed. Access to other technologies is limited: only 15 percent of households have a personal computer and only 9 percent of households have internet access.

2.4.3. Issues to be Addressed

The main challenge is to increase access to ICT services, which is low in Nigeria by international standards, particularly concerning access to internet. The levels of access to communications technologies in Nigeria are still low relative to the middle income comparator countries. The number of mobile and fixed line subscribers per 100 people in Nigeria is roughly comparable to that for Pakistan and Bangladesh, except for internet users which is roughly comparable to that for Mexico, Indonesia and South Africa.

Affordability of ICT services remains a constraint despite recent progress. Intense competition in the mobile and fixed line segments of the network has driven prices down: the cost of calls in Nigeria was roughly comparable to the averages for Sub-Saharan Africa as a whole; but since 2009 there has been further substantial decline in the cost of local cellular calls. However, the price of internet access remains high in Nigeria, even by Sub-Saharan African standards; the launch of the Main One submarine cable in 2010, with landing stations in Nigeria and Ghana has provided competition for the monopoly position previously held by the SAT-3 submarine cable and is expected to drive internet access price down. Further economies of scale through competition between operators should be encouraged for Nigeria to benefit from its large domestic market and fiber optic network.
3.1 Overarching Goals

The goals articulated in Vision 20:2020 are to:
• Improve the living standards of the citizens
• Place the country among the top 20 economies in the world
• Achieve a minimum GDP of US$ 900 billion and a per capita income of no less than US$ 4,000 per annum.

Recognizing the enormous human and natural endowments of the nation, the proposed priorities to achieve the selected goals are:

i. overcome the current pervasive shortcomings in the infrastructure network;
ii. laying the foundations for sustained strong economic growth of 10 percent annually in the non-oil economy;
iii. rehabilitating the existing infrastructure and substantially increasing their capacity; and
iv. expanding Nigeria’s integration with other countries of the West Africa Region.

3.2 Sectoral Goals

3.2.1 Transport

Roads. The proposed main goals are:
i. reconstruction, rehabilitation and selective upgrade of existing Federal, State and Local Government infrastructure in poor or failed condition;
ii. dualization of a number of Federal primary roads to expand traffic capacities;
iii. construction of new Federal primary road infrastructure; and
iv. rehabilitation of the State and Local Government road networks and a modest expansion of the secondary networks to cope with continued rapid urbanization

Railways. There are four basic goals for the reform of the railways system in the decade ahead:
i. transform the Nigerian railway system from a non-performing and debt-ridden transport mode to a dynamic and more functional transportation system;
ii. reduce the burden of the railway sector on the Federal budget through investment by the private sector;
iii. encourage the use of rail concessions to provide reliable services to reduce road traffic congestion problems and other negative externalities and;
iv. strengthen domestic capacities for supply of goods and services required for construction and operation of the railway infrastructure.

Ports. The proposed goals of Nigeria’s seaports are to:
i. build two “Greenfield” new port facilities;
ii. improve port productivity with further reductions in turn-around time for vessels;
iii. reduce tariffs through competition at the ports;
iv. improve safety and security at the ports;
v. accommodate large ocean liners and improve RoRo facilities and;
vi. accommodate efficiently the growing traffic, particularly container traffic.

Shipping. The proposed goals of the shipping policy are:
i. facilitate indigenous participation in the carriage of cargo including for crude petroleum;
ii. promote human capacity for the manning of maritime vessels by Nigerians and;
iii. expand domestic shipping.

Inland waterways. The proposed goals are:
i. an increase in the navigable routes on the inland waterways;
ii. rehabilitation and construction of key river ports, jetties and wharfs;
iii. dredging and reclamation of the rivers Niger and Benue and;
iv. concession of selected routes to the private sector.
Civil Aviation. The goals of the civil aviation policy for Nigeria are as follows:

i. ensure a high standard of aviation safety through the enforcement of maintenance and high operational standards for aircraft and in the use of airports;

ii. implement the safety requirements derived from international agreements and particularly the Chicago Convention and its annexes; and

iii. take preventive and remedial measures for enhancing air safety.

Gas Transport. The specific goals in support of the development of the gas industry are:

i. establishing a gas pricing policy that provides a framework for establishing the minimum gas price that any category of gas buyer can be charged;

ii. ensuring gas availability for critical domestic gas utilization projects that will advance the economic growth in Nigeria and;

iii. establishing of a network of gas hubs comprising gas gathering and processing facilities, and a network of gas transmission pipelines that will result in a reduced cost of gas supply in Nigeria and eliminate flaring.

Urban Transport. The proposed goals are:

i. better serve the needs of the existing and future urban population.

3.2.2 Electric Power and Access to Energy

Generation. The key goals for the power generation program are:

i. completion by end-2013 of all ongoing and proposed rehabilitation of the existing facilities owned by the government;

ii. addition of 4,775 MW of private power projects by 2014;

iii. privatization by 2014 of 5,203 MW of thermal plants;

iv. expansion of hydropower to bring hydro capacity of the country to 6,170 MW; and

v. attracting a substantial amount of new private investment in generation facilities.

Transmission. The goals for the transmission grid are as follows:

i. build a transmission grid that can efficiently evacuate all generated power;

ii. create adequate network redundancies to ensure a high degree of reliability for power supply;

iii. reduce transmission losses to less than 5 percent; expand the network of grid connections with neighboring countries to facilitate trade in electric power;

iv. improve the financial performance of the TCN to ensure it is an attractive and financially reliable partner for private investors;

v. create a capacity to evacuate between 30,000 MW and 40,000 MW of power by 2020; and

vi. rehabilitate and automatize operation of all transmission stations.

Access. The goal for increasing access to electricity is:

i. the connection of 19.8 million households, including 11.5 million urban households and 8.3 million rural households.

Rural Electrification. Rural electrification and related use of off-grid energy goals include:

i. utilize mini and micro hydropower schemes and renewable energy to extend electricity to rural and remote areas;

ii. develop the nation’s wind energy resources including a 10 MW contribution from wind energy by 2013, and use wind resources to extend electricity to rural and remote areas;

iii. develop the nation’s solar energy resources for electricity generation, especially in remote and rural areas, to achieve a 10 MW contribution from solar power by 2013; and

iv. promote the use of biomass energy to achieve 1,000 MW of electricity supply from biomass resources in the longer-term.

3.2.3 Water Resources, Supply and Sanitation

Irrigation. The goal of the proposed program for irrigation for 2011-20 is to

i. develop 2.1 million hectares of the land that is suitable for irrigation.

Water Supply. The goals of the proposed policy
are premised on the following framework:

1. Water is distributed equitably for poverty reduction and 100 percent of the population has access to improved water by 2020;
2. Service providers have autonomy for the provision of water supply and sanitation;
3. Management of such services is decentralized to the lowest appropriate level;
4. Water policy and service regulation is left to the Federal Government;
5. The cost recovery associated with the provision of water services is improved substantially so that by 2020 revenues from water sales meet the full cost of service provision;
6. The role of the private sector in provision of water related services is substantially expanded.

**Sanitation.** The proposed goals are:

1. Providing 80 percent of the population with access to improved sanitation by 2020;
2. Building substantially the public and private capacities for effective service delivery of improved sanitation throughout the country;
3. Strengthening the legal and regulatory framework that underpins the provision of sanitation services throughout the country; and
4. Expanding the role of the private sector in provision of sanitation related services.

### 3.2.4 Information and Communication Technologies

The goals include the following:

1. Expansion of ICT infrastructure and communications services to under-served urban areas and rural communities and achieve a teledensity of 75 percent by 2015 and 100 percent by 2020;
2. Establish a national ICT backbone network;
3. Promote competition among service providers within the industry;
4. Establish a national digital library;
5. Promote a range of e-applications, including e-learning, e-governance and e-commerce; and
6. Promote access to internet resources in all education and research institutions.
4.1 Transport Action Plan

The cost of developing the proposed infrastructure program with the suggested action plans in the decade ahead is estimated at US$350 billion (at 2010 constant prices). This total includes US$15 billion for capacity building and technical studies required, thus, about US$285 billion for the rehabilitation and expansion of the actual infrastructure of the country. Note that at the time this analysis was completed for the Report, there was no data available for actual levels of public and private development expenditures for the infrastructure sectors in 2011. In the event that actual spending continued to be in the range of 2% of GDP, actual outlays may have been around US$5.5 billion, rather than the proposed US$11.6 billion in the Report.

Funding Sources and Related Challenges.
The Federal Government has been the primary financier of infrastructure projects in Nigeria and has often taken the responsibility for construction, operations and maintenance as well. These arrangements have been volatile due to unstable budget allocations failing to meet crucial infrastructure needs, and have proved to be unsustainable. As chapter 2 of the main report discusses, one consequence of this situation is that, infrastructure development in Nigeria has been underfunded for many years. For instance, between 1999 and 2007, the Nigerian government spent about Naira 2 trillion through direct budgetary allocations for basic infrastructure in agriculture, water resources, transportation, power generation and others.

Types of Funds Available. There is gradual recognition that budget allocations may not be the best way to finance and execute infrastructure development. Methods for public and private financing of infrastructure development in various parts of the world have evolved to meet the emerging priorities and requirements that range from feasibility and project initiation financing to construction and longer—term operations.

The forms that have recently been encountered in international project finance include infrastructure funds, non-recourse or project finance, project bond funding, guarantees or credit enhancement programs, joint ventures, and public private partnerships (PPPs). Large pension funds and insurance firms have also created a number of special purpose international investment funds for infrastructure projects. Quite a number of these facilities operate in Africa, including the Africa Infrastructure Fund (AIIF), the Emerging Africa Infrastructure Fund (EAIF), the Pan-African Infrastructure Development Fund (PAIDF), and the EU-Africa Infrastructure Partnership Trust Fund. Recently, the African Development Bank (AfDB) has proposed the roll out of an Africa50 Fund to explore opportunities for financing Africa’s Infrastructure. In July 2013, US President, Barack Obama announced the Power Africa Initiative which would also explore latest technologies that provides efficient and reliable power to national grids in Africa.

Discussions are ongoing for the activation of Gulf of Guinea Infrastructure Fund (GoGiFund). Pension Funds from 23 nations of the Gulf of Guinea, including PENCOM, will be investing in this fund. Indications are that these institutions collectively hold in excess of US$12 billion. Some of these financing options are already being explored by the Federal Government of Nigeria.

Mobilization of US$350 billion required during 2011-20 for the proposed Infrastructure Action Plan (IAP) poses formidable challenges. It will require substantially larger roles for public and private sectors in the financing, construction and operation of the infrastructure and in provision of infrastructure services during 2011-2020. The report outlines some options on how the arrangement and mobilization of these resources can be undertaken.
Toll Plaza of the Lekki-Epe Toll Road in Lagos State. The project is co-financed by the African Development Bank.

Geregu Gas-Fired Power Plant in Kogi State, commissioned in 2007

New Diesel-Electric Locomotives purchased by the NRC in 2011

Onne Port, Rivers State
### 4.1.1 Rationale of the Transport Plan

#### Roads.
This expected growth in the vehicle fleet has important implications for the development of road infrastructure: the fleet of 2- and 4-wheel motorized vehicles is projected to grow from an estimated 10 million in 2010 to 26 million by 2020, including a threefold increase in four-wheel vehicles to a total of about 16 million by 2020. At that time, the number of 4-wheel vehicles per 1,000 people will be about 80, which is comparable to the current vehicle density in Indonesia. The number of 4-wheel vehicles per km of road will increase to about 70 million, which would be comparable to the current situation in Mexico.

#### Civil Aviation
Total passenger traffic will increase from 14 million in 2010 to almost 32 million by 2020 and domestic traffic from 10.7 million in 2010 to about 25 million by 2020. The upgrade and expansion of airports as well as at least one new greenfield international airport in Lagos will be needed to accommodate the present and future air traffic.

#### Railways.
The Nigerian Railway system has the potential to provide an efficient and cost effective means of transport, particularly on long distance routes serving high density traffic flows. The railway network is expected to be carrying at least 40 million tons of freight by 2020.

#### Ports.
Total freight (excluding LNG exports) is projected to grow at about 10 percent a year during 2011-20. Total freight will increase from 75 million tons in 2010 to 194 million tons by 2020. Container traffic will grow more rapidly and by 2020 containerized freight accounts for 18 percent of total freight, compared with 12 percent in 2010.

#### Inland Waterways.
The coastal and inland waterway transport system is expected to relieve the pressure on the country’s rail and road transport infrastructure. River freight traffic is projected to grow at 9 percent a year to about 1.7 million tons a year by 2020.

#### Inland Container Depots.
The ICDs will assist in decongesting the seaports, help revive the railway as a primary mode for the long distance haulage of cargo, and contribute to reduce the cost of transit cargo to landlocked neighboring countries.

#### Gas transport.
Total demand is projected to increase by an average of 20 percent a year to a total of about 6,380 billion cubic feet a year by 2020. Exports of LNG to Europe and the USA, and dry gas to Benin, Ghana and Togo are projected to grow by an average of 14 percent a year and account for about 47 percent of total demand by 2020. Domestic demand is projected to grow by an average of 35 percent a year, driven by the projected large increase in consumption by gas-fired thermal power plants from a small base at present to about 615 billion cubic feet a year by 2020. The implication is that apart from the importance of building an integrated national grid for gas transport, there will also be need for substantial investment in feeder lines to particular industrial and urban locations.

#### Urban Transport.
The urban population of Nigeria is projected to continue growing at about 4 percent a year in the decade ahead to a total of 116 million by 2020. At that point, about 57 percent of the population will live in urban areas. For the 47 major cities in Nigeria, the latter estimate translates into an increase in demand of 5.2 million public transport trips per day during 2011-20, requiring substantial improvement and expansion in the urban transport infrastructure and services.
4.1.2 Action Plan for Transport Sector

**Roads.**
- About 145,000 km of the existing network (equal to about 75 percent of the total network) would be rehabilitated and selectively upgraded, including rehabilitation and upgrade of the tertiary network that serves rural communities.
- Some 7,993 km of existing Federal primary and secondary roads will be dualized, with all of the primary roads completed and 1,685 km of the secondary roads in the Federal network.
- The network will be expanded by about 2,900 km (including 726 km of the Niger Delta Coastal Highway and 1,000 km of new secondary roads at the state level, primarily in response to continued rapid urbanization).

**Railways.**
- Completion of the rehabilitation of 85 percent of the existing narrow gauge rail as a first priority for the revival of the railways and completion of the Ajaokuta-Warri standard gauge line. The proposed program would include rehabilitation of rail links at Nigeria’s main ports.
- Construction of mass transit rail lines in Lagos and Abuja.
- Award of concessions for the rail lines from Lagos to Kano and from Port Harcourt to Maiduguri.
- Construction of rail lines to Inland Container Depots (ICDs) to link them to all sea ports, international airports and major industrial and economic centers.
- Expand the standard gauge network by 784 km including: (i) the Abuja/Idu to Kaduna line; (ii) a rail link between Abuja and the seaports of Lagos, Warri and Port Harcourt; (iii) links to Abuja from Minna, Kafanchan, and Itakpe; (iv) the coastal link from Calabar to Benin City; and (v) an East-West rail link from Abeokuta to Benin City.

**Ports.**
- Build two new major deep sea ports. One would be in the South-West, either at Lekki or Badagry in Lagos State, or Olokola in Ogun/Ondo States, and the other would be in the South-East, either located in Rivers State (Bonny) or Akwa Ibom.
- Improve management under concession agreements.
- Investments in cargo handling equipment and deepening at berths to an average of 13 meters to allow for larger vessels.
- Deepen channels by an average of about three meters, particularly the channels for the Lagos complex and the Bonny-Port Harcourt channel. The ports served by these channels accounted for about 85 percent of the total freight in recent years.

**Inland Waterways.**
- Dredging and installation of navigation aids for 24-hour and year-round navigation on key inland waterways.
- Promote pricing policies that will shift traffic to inland waterways.
- Restructure the National Inland Waterways Authority (NIWA) to give opportunities for private sector participation in the management and operation of the waterways routes.
- Establish an Inland Waterways Safety Inspectorate to reduce the number of accidents.

**Inland Container Depots.**
- Build six depots with customs clearance facilities in the states of Abia, Bauchi, Plateau, Oyo and Borno to accommodate containers shipped by rail from the seaports.

**Civil Aviation.**
- Upgrade and expand the international airports, improve air safety to ICAO standards.
- Concession of the four international airports and transfer of all domestic airports to State Governments.
- Rehabilitate all 21 airports operated by FAAN.
- Expand the capacity of particular FAAN airports to meet the projected growth in demand for passenger services.
- Construct a small number of new airports to meet clearly identified new demand for air services.
- Add 50-60 aircraft to the fleet to increase transport capacity by 5,400 available seats.
Urban Transport. The proposed program includes a program for the 47 major cities and a program for the other urban areas:

- Repair the 30,000 km of urban roads by 2020, with almost 90 percent of the network paved.
- Pave 14,160 km of new roads.
- Execute periodic maintenance works on 4,444 km of urban roads in fair condition.
- Execute routine maintenance on 2,523 km of roads.
- Develop integrated mass systems to service entire metropolitan areas emphasizing bus and rail (rail mass transit program for Lagos, Abuja, and Port Harcourt) systems and city ferry services to meet the growing needs for urban transport throughout the country. The program will include:
  - Replacing 180,000 (about 70 percent) of the existing minibus fleet (funding to be provided by private sector commercial banks);
  - Increasing the total fleet of large buses to about 32,500 (compared to 3,800 presently);
  - Equipping all 47 major Nigerian cities with modern high capacity bus fleets and develop in twelve cities with projected populations of one million or more by 2020, Bus Rapid Transit (BRT Lite) systems requiring almost 8,400 buses operated by private companies on 500 km dedicated highly trafficked routes under concession schemes, and build 90 new bus parks; and
  - Replacing one fifth of the existing fleet, i.e. 40,000 vehicles and expand the fleet by an estimated 243,000 vehicles.

4.1.3 Organizational Changes and Capacity Building needs for Transport.

Railways. An effective institutional framework for the railways sector in Nigeria remains to be developed and implemented:

- The existing Railways Act needs to be repealed and replaced by a new Railways Act setting-up a new regulatory framework for the sector separating the roles of government, the regulator and the private sector in the provision of both freight and passenger services.
NRC should be restructured to accommodate the introduction of service provision by private concessions; its role will have to be redefined. A substantial capacity building program for NRC will be needed to ensure it is equipped to handle its new role in the provision of rail services.

NRC needs to prepare a business plan for the transition to a regime in which a growing share of services is provided by concessionaires. Capacity building for development and oversight of railways related concessions by the Infrastructure Concession Regulatory Commission (ICRC) and other government agencies. Comprehensive assessment of pricing policies for passenger traffic should be prepared and examined by the Government, with due consideration for special fares for certain segments of passengers, while ensuring the overall profitability of the railways, in order to attract private concessionaires.

Funding and selection of transactions advisors for the concessions to private operators

Ports.
- Continuing to build the capacities of Nigeria Ports Authority (NPA) to exercise its responsibilities.
- Building the capacities of maritime training institutions in Nigeria to train about 50,000 seafarers to fulfill the needs of the Nigerian shipping industry.

Inland Waterways.
- Capacity building for the National Inland Waterways Authority (NIWA).

Civil Aviation.
- Prepare a strategy for a transition from publicly owned and operated airport facilities and services to an industry in which the private sector plays a major role in service provision.
- Providing comprehensive training for skilled personnel in the civil aviation industry to meet the projected doubling of the work force.
- Nigeria may also need to provide leadership in ensuring that the formal and informal barriers that continue to stand in the way of liberalization of the air transport services within the West Africa Region as required under the Yamoussoukro Decision of 1999 are removed.

Urban Transport.
- Building institutional and human capacities at the national and particularly sub-national/municipal level.

4.1.4 Costs of the Transport Action Plan

Roads.
- The proposed capital expenditure program is estimated to amount to US$ 41 billion for road infrastructure and US$ 27 billion for periodic and routine maintenance of the national road network.
- The total cost of programs for capacity building and institutional development amounts to about US$ 695 million and the cost of technical studies will amount to about US$ 932 million.

Railways.
- The total cost of rehabilitation of the proposed 2,993 km of single track line is estimated to be about US$ 540 million.
- The cost of the proposed investment in new capacity is US$ 8.8 billion.
- The program of capacity building, institutional development and technical support amounts to about US$ 250 million, and high priority technical studies related to the proposed investment program amounts to about US$ 360 million.

Ports.
- The total cost of the seaports development program is estimated at about US$ 19 billion. It includes US$ 1.83 billion for additional investments in the existing terminals (including all those that are operated by concessionaires); and dredging for US$ 1.17 billion.
- Capacity building cost is estimated at about US$ 75 million.
- Feasibility studies and detailed design studies will cost about US$ 250 million.

Inland Waterways.
- Rehabilitation and upgrade of nine river ports and two jetties is estimated to be about US$ 176 million in addition to the 2009-20 budget allocations of US$ 45 million.
- Acquisition of 16 tow barge units for US$ 248 million.
- Acquisition of 13 ferries for passenger transport;
construction of 14 ramps for new crossings and rehabilitation of six ramps, for a total of US$ 226 million, including US$ 132 million for the ferries and US$ 95 million for landing terminals.

- Technical studies and capacity building for US$ 16 million.

**Inland Container Depots.**
- The total investment cost for six ICDs is estimated at US$ 64 million.

**Civil Aviation.**
- The rehabilitation of all 21 of the FAAN airports is estimated to cost US$ 1.1 billion.
- About US$ 530 million is required for the rehabilitation of the four international airports (Lagos, Abuja, Kano and Port Harcourt).
- About US$ 590 million is required for the 17 domestic airports of FAAN.
- Detailed studies of the possible additional runways at existing airports and the proposed two new airports for US$ 33 million.
- Actions for air traffic control and safety amounts to US$ 400 million, including US$ 350 million for purchase of traffic control and safety equipment, US$ 30 million for training programs, and US$ 20 million for activities related to strengthening implementation of regional and international aviation agreements.
- The cost of the fleet expansion may be in the range of US$ 3.3 billion.
- The capacity building program and technical studies amount to US$ 117 million. It includes about US$ 83 million of support for capacity building and institutional strengthening and US$ 33 million for technical studies and detailed design studies.

**Gas Transport.**
- The capital cost of the three gas hubs is estimated to be about US$ 4.0 billion.
- The estimated capital cost of the national pipeline program is US$ 19.6 billion.
- The investment in the additional LNG trains is estimated at US$ 5.1 billion.
- The cost of the additional LNG vessels will be US$ 14.5 billion; and
- The Trans-Sahara Gas Pipeline investment cost was estimated at US$ 10 billion in 2008.

**Urban Transport.**
- Capital expenditures for the rehabilitation, upgrade and expansion of the tertiary network is estimated at US$ 14.3 billion, including about US$ 11.1 billion for the 47 major cities and US$ 3.2 billion for the other urban centres.
- The capital cost of the four ongoing and proposed rail mass transit program for the cities of Lagos, Abuja, and Port Harcourt is estimated to be about US$ 11.2 billion, approximately US$ 8 billion of which is for the construction of the entire network for Lagos.
- The cost of the rehabilitation program is estimated at US$ 22 million and new park program is estimated at US$ 180 million; two bus depots would be constructed in each of the 47 cities, at a unit cost of US$ 2 million each. A total of 9,400 bus shelters will be constructed at a unit cost of US$ 0.08 million each.
- The capital cost of the proposed program for substantially improved public bus services in Nigeria is estimated at US$ 20.4 billion.
- Taxi replacement cost would be US$ 992 million; the cost of the fleet expansion is projected to be US$ 5.8 billion.
- The investment cost for creation of adequate parking space in urban areas is US$ 597 million;
- The cost of the pedestrians and three-wheelers programs is about US$ 6.464 billion, of which US$ 4.428 billion for the upgrade and expansion of the motorized 3-wheeler programs, and US$ 1.412 billion for improvements for pedestrian traffic.
- Capacity building and provision of various services for US$ 1.1 billion and about US$ 660 million for various technical studies for the design of the urban transport programs.

**4.2 Electricity and Rural Access**

**4.2.1 Rationale of the Electricity and Rural Access Plan**

The power sector needs to deliver reliable supplies of power at affordable prices in a deregulated market, while optimizing the on- and off-grid energy mix. It is expected that the electricity supply industry will be private sector led with government providing an appropriate legal and regulatory environment for private capital investment.
The report calls for an increase in the generation capacity by 35,000 MW by 2020 corresponding to a total installed capacity of 39,970 MW. This translates into a total power supply of close to 277 TWh by 2020. Realization of this goal would triple the annual consumption of electricity in Nigeria from 500 kWh per capita to about 1,500 kWh per capita by 2020.

It is expected that by 2020, 85 percent of urban households would have access to grid-supplied electricity and that 60 percent of rural households would have access to electricity, either from off-grid sources including solar panels, wind power, and mini-hydro schemes, or from connections to the national grid. Even so, there would still be 17 million urban residents and 35 million rural residents without access to electricity by 2020. The result is that consumption of electric power would grow at an average of about 28 percent a year during 2011-20.

4.2.2 Action Plan for Power and Rural Access

- Privatize of all its thermal power stations and retain ownership of the existing hydropower stations.
- Improve the performance of distribution through investment in transmission and privatization of the distribution companies.
- Investment in transmission will comprise of:
  - expansion of the existing network of 330kV by about 2,350 km to bring the total 330kV network to about 7,870 km by 2020; (ii) expansion of the existing 132 kV network by 2,353 km to bring this network to a total of 9,155 km by 2020; and
  - installation of 2,460 km of high voltage 760 kV transmission lines that would provide a “super grid” for the national network.
- Investment in distribution will include:
  - the rehabilitation of two-thirds of the existing 66,230 km of 33 kV and 11 kV distribution lines;
  - the connection of an additional 11,518 million households in urban areas and 4,150 rural households to grid supplied electricity; and
  - the construction of 110,150 km of the 33kV and 11 kV distribution lines.

4.2.3 Organizational Changes and Capacity Building Needs

The key elements of the capacity building program include:

- Support for institutional capacity building to the Federal and State governments and to specialized agencies such as NERC, TCN and the REA for planning and operational activities.
- Training programs for managerial and technical staff.
- Improvements in billing and commercial operations.
- Early action on implementation of an expanded training program for successful implementation of the proposed power sector program through support to the National Power Training Institute of Nigeria (NAPTIN).
- Conduct analytical and technical studies to:
  - provide guidance on the strategies to be followed in the development of the sector and the generation of bankable project documents;
  - assess the needs for immediate rehabilitation of generation, transmission and distribution networks;
  - prepare strategic framework and development program for the power sector for the short- to medium-term;
  - prepare transmission and distribution master plans;
  - prepare feasibility studies for generation and transmission projects;
  - prepare feasibility studies for expansion of the rural access program, including increased use of solar power and other renewable energy sources;
  - prepare institutional and tariff studies.
- Selection of a team of transaction advisers with extensive international experience for the privatization of thermal plants.

4.2.4 Cost of the Energy and Rural Access Action Plan

- The capital cost of the proposed power generation program amounts to about US$ 40.9 billion during 2011-20, including investment of about US$ 25 billion in new generation capacity by the private sector and US$ 15.2 billion of public in-
vestment in new hydropower stations.

- The capital cost of the program of rehabilitation of existing transmission facilities and construction of the additions to the transmission grid are about US$ 11.4 billion.
- The investment in an additional 110,150 km of distribution lines is US$ 3.084 billion and the connection of the additional 11.518 million urban households during 2011-20 would cost about US$ 1.73 billion; for off-grid access to electricity the indicative cost of the proposed program is about US$2.065 billion.
- The cost of the capacity building program and technical services required amounts to about US$ 1.6 billion and the cost of technical studies to about US$ 800 million.

4.3 Water Resources, Supply and Sanitation

4.3.1 Rationale of Water Resources, Supply and Sanitation Action Plan

Water Resources. The implementation of the proposed program is necessary to ensure the effective management of the water resources of the country and also ensure an adequate supply of water for agricultural and non-agricultural uses.

Irrigation Services. FAO estimates that Nigeria’s irrigation potential could be as much as 3.2 million hectares, but less than 10 percent of this potential is actually in use although the Nigerian economy is very dependent upon agriculture. Full development of this substantial potential would result in a fivefold increase in the food sufficiency of the country (FAO Survey). With improved management of irrigation and multipurpose dams, sufficient water for all year-round irrigation would be possible.

Water Supply. The purpose of the program is to provide 100 percent of the population with access to improved water by 2020. As a result a total of 111 million Nigerians would gain access to improved water. The purpose of the program is also to improve substantially the cost recovery associated with the provision of water services so that by 2020 revenues from water sales meet the full cost of service provision. The program will expand the role of the private sector in the provision of water related services.

Sanitation. The purpose of the program is that 164 million Nigerians would gain access to improved sanitation and that by 2015, 75 percent of public places and schools will have adequate toilet facilities. The program will: (i) broaden access to improved sanitation to improve public health and reduce the current high mortality rates caused by water-borne diseases; (ii) decentralize the management of sanitation services to the lowest appropriate level; and (iii) assign sanitation policy and service regulation to the Federal Government.


Water Resources.

- The first priority is the rehabilitation of existing dams and introduction of measures to improve the management of stored water resources.
- The second priority is the construction of a number of new dams for irrigation and multipurpose use (irrigation and water supply). Attention should be given to small-to medium-sized dams with smaller, but deeper reservoirs to reduce water loss due to evaporation.
- The third priority is to address the increasingly serious problems of water pollution, especially in oil producing areas of the Niger Delta.
- The fourth priority is to introduce measures that support the resilience of water resources to climate change including: drilling boreholes to lower aquifers to recharge depleted surface water; promoting water recycling and waste water re-use; promoting greater efficiency in water use (e.g. through drip irrigation); using closed conduits instead of open channels; using artificial recharge to reduce evaporation; raising dam heights; raising the useful storage volume through installation of fuse gates; removing sediment from reservoirs for more storage; protecting watersheds and reservoir sites through establishment of intensive vegetation cover to minimize evaporation; better monitoring of ground-water resources; and improving rain-harvesting techniques.
- The fifth priority is the preparation of a series of water resource assessments, to support decisions about the design of water resource management programs.
Irrigation.
- The first step in this program will be a series of detailed surveys to assess the full potential of areas judged to be suitable for irrigation.
- The second step will be the development of Fa-dama-type interventions and water harvesting linked to flood control schemes. It will permit the irrigation of about 540,000 hectares, or about 30 percent, of the area suitable for irrigation.

Water Supply.
- The first step is the rehabilitation of existing infrastructure and completion of abandoned viable water projects, including on the spot distribution and full reticulation projects.
- The second step will be to expand capacities for the provision of urban water supply services by:
  - developing PPP-type contracts to improve financial viability and outsource services such as accounting and billing arrangements;
  - ensuring there is adequate maintenance of the increasing large urban water service infrastructure;
  - sustaining programs for institutional improvement and capacity building; and improving governance and implementation of the National Network Policy.

Sanitation.
The proposed program would include the following:
- Supporting the development of household Sanplat and ventilated Sanplat latrines.
- Supporting the development of Sani-Centers.
- Build upgraded ventilated improved pit (VIP) latrines in small communities with populations of less than 5,000.
- Support Local Government Councils (LGCs) to rehabilitate, upgrade or construct new public latrines at schools, motor parks and market places.

4.3.3 Organizational Changes and Capacity Building Needs for Water Resources, Supply and Sanitation

Water Resources.
- Strengthen the legal and regulatory framework that underpins the provision of water services.

4.3.4 Cost of Water Resources, Supply and Sanitation Action Plan

Water Resources. The proposed program for water resources management involves development expenditures of US$ 2.178 billion, including US$ 1.95 billion for construction of new irrigation and multipurpose dams, US$ 210 million for capacity building and technical studies, and US$ 23 million for rehabilitation of existing dams.

Irrigation. The total cost of the downstream irrigation works is estimated at about US$ 8.43 billion, and the upstream investment is estimated at US$ 1.94 billion for the dams. In addition, a total of about US$ 740 million would be required for capacity building programs and for feasibility and other technical studies.

Water Supply. The cost of the proposed water supply program is about US$ 19.6 billion, including US$ 13.1 billion for the rehabilitation of existing urban water supply infrastructure and investing in new facilities, and US$ 5.0 billion for infrastructure associated with the rural water program. The capacity building and the technical studies related to the design and implementation of the program are estimated to cost US$ 1.5 billion.

Sanitation. The cost of the proposed sanitation program is estimated to be US$ 68.8 billion, including capital expenditures of US$ 59.1 billion for urban sanitation and US$ 4.7 billion for rural sanitation.
Support for capacity building and technical studies are estimated to cost about US$ 505.2 million.

4.4 Information and Communication Technologies (ICT)

4.4.1 Rationale ICT Action Plan

The ICT program will respond to the need for improved access to ICT services throughout the country; to expanded access to a full range of ICT services at competitive prices that will improve international competitiveness, and to meet the future demand projected to increase from about 88 million in 2010 to around 200 million subscriptions for mobile and fixed lines.

4.4.2 Action Plan ICT.

- Development an open access model for the deployment of a high-bandwidth backbone network for the country linked to networks in other countries in West and Central Africa.
- Develop a regional e-Government platform that would deepen regional economic integration and trade among member states and the rest of the world.
- Establish an independent infrastructure provider (Infraco) licensed by NCC responsible for building, operating and maintaining the fiber-optic network, leasing fiber-optic connections to operators and companies as well as the public.

4.4.3 Organizational Changes and Capacity Building Needs for ICT

- The proposed ICT programs and infrastructure will require a substantial increase in the number of skilled technicians required to operate and maintain the proposed facilities and services within the public and private sectors.
- In the public sector the Federal and state governments will require additional skilled and semi-skilled staff for the proposed e-Applications that will be developed and operated by public agencies.
- Reactivate NITEL to immediately inject necessary ICT capacity into the national telecommunications network. NITEL can be sold to a suitable investor. An option is to break the company into several units in charge of: (i) national interconnect exchange carrier; (ii) international gateway services; (iii) national long distance service (transmission); (iv) 37 regional voice and data service provision units (36 states plus the federal capital territory).

4.4.4 Cost of the ICT Action Plan

- The proposed project of harmonization of systems across ECOWAS would cost US$ 252 million.
- The proposed program for further development of the fiber-optic network of the country requires additional capital outlays of about US$ 1 billion. This program includes US$ 264 million for further expansion of access to the Trans-Atlantic submarine cable network in the latter part of the decade ahead. It also includes US$ 11 million for additional landing stations.
- A total of about US$ 500 million would be required for the expansion of the backbone network by some 25,550 km.
- The expansion of the existing digital microwave transmission backbone adding 8,500 km to the existing network of 11,500 km would cost about US$ 290 million.
- The cost of developing Broadband Integrated Communications Network Infrastructure is estimated to be US$ 1,042.5 million, including US$ 842.5 million for the e-Health and e-Education applications. The project would be designed to generate revenue to guarantee its financial sustainability.
- The cost of the proposed capacity building programs for ICT is estimated to be US$ 5 million at 2010 constant prices.
lion for capacity building and technical studies and about US$ 285 billion for the rehabilitation and expansion of the infrastructure. About US$ 193 billion will be for infrastructure owned by the public sector, and US$ 92 billion for privately owned infrastructure (including, for example, power generation and distribution networks, communications networks, irrigation schemes, and water supply and sanitation facilities that serve rural communities).

The proposed capital expenditures for infrastructure rise steadily in relation to GDP starting at 4.6 percent of GDP in 2011, peaking at 12.6 percent in 2016 and then declining steadily to about 9.6 percent by 2020. It is this rapid build-up in investment in infrastructure that lays the foundations for subsequent sustained growth in the non-oil economy of about 10 percent a year.

The program if finally implemented will bring a number of specific benefits to Nigeria, including more reliable and lower cost electric power supplies, improved transport services and lower costs associated with moving freight to domestic and international markets, as well as a substantial expansion in the number of people that have access to improved water and sanitation services. The proposed shift in emphasis to mass transit systems in urban areas will improve mobility in the major cities, and reduce congestion and vehicle emissions that undermine the quality of life in these cities. In addition to these improved services, the program will also create substantial additional business and employment opportunities during the construction phase of the program and subsequently through the enlarged programs of periodic and routine maintenance that will be required to keep the infrastructure in good working order.

In order to meet the challenge of implementing the Action program outlined in Section 4 of the main report, the following four issues are of particular concern:

- Arrangements for the mobilization of a total of US$ 350 billion of public and private financing for capex spending over the 2011-2020 period.
- Mobilization of close to US$ 100 billion for annual maintenance to maintain the infrastructure network in good working order.
- Facilitating the entry of the private sector into the infrastructure sectors on a substantial scale in the near- and medium-term for financing, operation of parts of the infrastructure network, provision of infrastructure related services, and maintenance of infrastructure assets.
- Building capacities in the public and private sectors for successful implementation of the program.

5.1 Development Expenditure Requirements

The cost of developing the proposed infrastructure program in the decade ahead is estimated to be about US$ 350 billion. It includes about US$ 15 billion for capacity building and technical studies and about US$ 285 billion for the rehabilitation and expansion of the infrastructure.
US$ 11.0 billion. Nearly half of the program design work is for sanitation and water management (US$ 4.9 billion), followed by power (US$ 814 million) and roads (US$ 800 million).

**Capital Investment.** The largest sectoral programs are for electric power and rural energy (US$ 61 billion) and sanitation and waste management (US$ 64 billion). Rehabilitation and expansion of the national road network is projected to cost about US$ 35 billion. The infrastructure for urban roads and mass transit systems is estimated to cost about US$ 19 billion and US$ 14 billion respectively. Other major infrastructure programs include US$ 19 billion for improvement of major seaports and facilities for passenger and freight movements on inland waterways, about US$ 18 billion for improved water supplies in urban and rural areas, and US$ 15 billion for the expansion of the proposed national communications grid.

In addition, the program requires US$ 50.1 billion of investment in transportation equipment, most of which will be LNG tankers for exports of LNG (US$ 14.5 billion), buses (US$ 16.5); taxis (US$ 6.8 billion) and aircrafts (US$ 6.4 billion).

### 5.2 Importance of Maintenance Expenditures

Lack of routine and periodic maintenance of infrastructure assets owned by the public sector has been one of the major factors that contributed to the decline in the quality of much of Nigeria’s basic infrastructure. The large amount of under spending on the maintenance of infrastructure has constituted a major waste of resources because the cost of rehabilitating these assets is substantially more than the cumulative cost of sound preventative maintenance.

The level of spending on maintenance that is required to keep infrastructure assets in good working condition is about 3-5 percent of the replacement value of the capital stock. The implication is that maintenance spending in 2010 should have been in the range of US$ 2.6 to US$ 4.3 billion a year, with about US$ 2.0 to US$ 3.2 billion of these expenditures applied to the maintenance of public infrastructure. It is estimated that public spending on maintenance was substantially less than US$ 1 billion in 2010.

Maintenance expenditures for new infrastructure under the proposed program will be about US$ 16 billion a year by 2020.

### 5.3 Key Challenges

**Domestic capital market.** The domestic capital market of Nigeria is relatively small and currently does not have the capacity to fund a substantial portion of the equity and debt requirements of the proposed infrastructure program. The non-bank financial sector and capital market remain substantially below comparator countries (1.7 percent of GDP compared to 91.2 percent in South Africa and 4.8 percent in Pakistan). For the purposes of this Report, it is assumed that the non-bank financial market will not play a significant role in funding infrastructure development.

**Domestic Banking System.** The banking system in Nigeria has a relatively low ratio of bank capital to total reserves, and a relatively low level of bank lending relative to GDP. It also has a large spread between the average lending and deposit rates and a high share of the gross loan portfolio that is classified as non-performing. At present, bank credit is the main source of external funding of investment by Nigerian firms; however, access to debt financing with longer maturities is very limited. Hence, there is a clear need for concerted efforts by the Federal Government and the Nigerian monetary authorities to create an operating environment that will facilitate provision of the longer-term loan maturities that are required for infrastructure investment.

**Nigerian Financial Market.** To accelerate development of long-term funding by Nigerian financial markets, action is needed on several fronts. These include the following:

- Development of a stable long-term pricing benchmark: the government bond market has just begun to provide a yield curve against which to price corporate debt.
- The market for primary corporate bond issues is underdeveloped. Further action is required to expand corporate and bonds credit ratings.
- The third concern is the absence of a liquid secondary market for sovereign and non-sovereign bonds. Investors are less likely to invest in long-term securities without a liquid exit option.
5.4 Public Sector Funding

ODA. Net flows of ODA to Nigeria averaged about US$ 1.8 billion a year during the five-year period 2007-2011; donor support for infrastructure accounted for about 15 percent of the total. Assuming that total inflows increase from to US$ 2.64 billion by 2020 and that the infrastructure sectors will account for about 24 percent of the net ODA inflows, the total amount of ODA allocated to the infrastructure sectors during 2011-20 would amount to about US$ 5.6 billion. This total allocation would account for only 1.6 percent of the required total funding for the proposed program. The bulk of the donor support should be allocated to the capacity building and technical studies components of the program along with selective use of guarantee instruments by donors to facilitate the inflow of much larger amounts of domestic and private capital into the infrastructure sectors.

Public Sector Funding. Some US$ 204.3 billion – 97 percent of which for capital spending – would have to be mobilized by the three levels of government. A three-pronged approach will be required: (i) Stabilized financing of infrastructure from the government budget; (ii) effective use of the resources of the Sovereign Wealth Fund (SWF) for direct investment in infrastructure projects and use of these funds to leverage resources from other sources; and (iii) concerted efforts to increase revenues from infrastructure services by improving substantially the recovery of the costs of service provision from service users.

Budget Allocation. The allocations in the consolidated government budget of about US$ 1 billion in 2010-2011 (about 2.5 percent of GDP) should be maintained in real terms in the decade ahead.

Sovereign Wealth Fund (SWF). The projection assumes that gross oil revenues amount to about US$ 535 billion during 2011-20, with US$ 165 billion being deposited in the SWF. The net increase in the assets of the Fund is projected to be about US$ 140 billion over the 2011-20 period. Some 40 percent of the allocation to the SWF should go to infrastructure development in this period. The Infrastructure Fund would therefore have about US$ 50 billion of funding for infrastructure development in the decade ahead. If these funds are then leveraged with debt and equity financing from sources outside the government on a 70:30 basis, the total amount of funding for infrastructure development that may flow from the activities of the SWF would be about US$ 165 billion during 2011-20. This would be equivalent to about 90 percent of the US$ 184 billion of the capital investment in infrastructure assets that are proposed for the three levels of government during 2011-20.

Revenues from infrastructure service. There is considerable scope for improvements in the efficiency in the public sector that can, in turn, generate financial resources to meet the capital and operating costs of the proposed program. About US$ 2.5 billion of additional resources could be recovered each year by improving the efficiency of infrastructure-related activities in the public sector. According to their analysis, much of the losses are reported to be in the power sector. These improvements will allow utilities to cover operating costs and perhaps make some contribution to the capital cost of the proposed infrastructure program.

Government Bonds. In 2003, the Federal Government issued FGN bonds. To meet some of the needs of the infrastructure program, the Federal Government, or the Sovereign Wealth Fund, could raise funds in the domestic capital market through the issue of bonds, and apply the associated proceeds to fund critical economic infrastructure projects. Another option is for State Governments or Project SPVs to issue bonds that are backed by the internally generated revenues of the government or by the SWF.

5.5 Mobilization of Private Capital

The funding requirements for the private sector portion of the proposed Infrastructure Action Plan amounts to about US$ 131 billion during 2011-20, with about US$ 96 billion for investment in infrastructure assets and related technical studies and about US$ 35 billion for the upgrade and expansion of the transport fleet. The main sources of funding will be equity of the participating investors, and debt mobilized in the domestic and international financial markets.
Equity. The total amount of private equity required for the proposed program is estimated to be about US$ 35.3 billion, including US$ 3.3 billion for technical studies, US$ 23.1 billion for infrastructure, and US$ 8.9 billion for the private transport fleet. In addition to equity provided by investors that intend to hold a controlling interest in the enterprises, start-up funds are usually available from venture capital (VC) groups. However, financing from traditional VCs for new projects is not usually available for international infrastructure projects, due to the high cost of due diligence and limited exit options for these firms. Typically high rates of return, often 25-50 percent, are also required. Large pensions and insurance firms have also created a number of special purpose international investment funds for infrastructure projects. Indications are that these institutions in Africa collectively hold in excess of US$ 12 billion.

Debt. Total capacity for new lending to the private sector would be US$ 107 billion during 2011-20. About US$ 96 billion of debt financing is required by the private sector for investment in infrastructure and the transport fleet. This level of borrowing is well beyond the likely capacity of domestic financial institutions. There is a clear need for concerted efforts by the Federal Government and the Nigerian monetary authorities to create an operating environment that will facilitate provision of the longer-term loan maturities that are typically required for the types of infrastructure investment. Domestic bank may lend about US$ 44 billion for infrastructure development, leaving a balance of about US$ 50 billion to be raised in international financial markets. A number of options are available to facilitate the involvement of the domestic banking sector in the infrastructure program:

- A consortium of domestic banks could issue bonds with a CBN guarantee and lend the proceeds directly to infrastructure project entities.
- The role of the existing Development Finance Institutions (DFIs) in Nigeria could be expanded, perhaps in partnership with the SWF.
- The CBN has invested Naira 500 billion (about US$ 3.3 billion) through the Bank of Industry for on-lending through deposit money banks (DMBs) to qualified borrowers at a concessional interest rate of not more than 7 percent p.a. and with loan maturities of 10-15 years.
- The Bank of Industry (BoI) and the Infrastructure Bank Plc. could issue infrastructure bonds on behalf of the FGN, or with a government or CBN guarantee, and on-lend the proceeds to infrastructure companies.
- DFIs may provide concessional loans for on-lending to infrastructure projects.
- The SWF could consider the provision of guarantees to commercial banks for extended loan maturities to say 15-20 years, along with funding that covers the cost differential between the market-based prime interest rate and a discounted rate that would be available for long-term investments in infrastructure.
- Commercial banking groups have expressed the desire to issue long-term (10-15 year) bonds in the domestic or foreign market on commercial terms to provide relatively longer-term financing for infrastructure development. The commercial banks will require the CBN to provide credit enhancement in the form of credit guarantees.

Pension Funds. The revised regulations on the investment of pension fund assets includes in its list of allowable instruments, infrastructure funds registered by the Securities & Exchange Commission (SEC) with a portfolio limit of 5 percent on infrastructure funds.

The immediate challenge over the next two to three years is for the Government to put in place policies and programs that address the above concerns about financing and implementation arrangements for the public and private sectors. In this way, Government will be able to demonstrate to existing and potential domestic and international investors and official and private lenders, its strong commitment to effective implementation of what will be the largest privatization of infrastructure sectors ever undertaken on the African continent.
The proposed program would translate into a substantial increase in demand for labor and domestic and imported goods and services. The challenge will be to promote a strong domestic response to ensure that a large share of these goods and services is supplied by the domestic business community and the domestic job markets responds to the demand adequately.

6.1 Accelerated Capacity Building

About US$ 126 billion would be spent on labor services under the program. Assuming about 10 percent of the skill requirements would be met by internationally recruited personnel, about $113 billion would be spent on skilled and unskilled labor in the domestic market.

Labor Market. A wide range of equipment operators will be required in the construction industry, for example, along with electricians, welders, mechanics, and others for construction work and for maintenance programs. However, there is a serious shortage of technical and vocational skills in the Nigerian labor market. Continued persistent skills shortages in the labor markets is a potentially serious obstacle for effective implementation of the proposed Infrastructure Action Plan. The skills gap manifests itself in three ways:

- lack of highly qualified professionals in specialized areas such as engineering and business administration.
- lack of entrepreneurial and management skills, which affects the ability of companies to respond to business opportunities.
- the low quality of technical staff, which leads to productivity losses and poor competitiveness.

Support to be put in place by the Government. The key policy issues here will be the manner in which people are trained, by whom and at what cost. In the case of equipment operators, for example, it is not unusual for successful contractors to assume responsibility for hire and training of the personnel required. To meet the demand for skilled trades-people such as electricians, surveyors, welders, the issue is the extent to which Nigeria has accredited training institutions. A concern to be addressed by the Government is the accreditation of those training institutions. Early action will be required to develop agreed standards and accreditation processes.

Developing Domestic Capacity to Supply Goods and Services. The program would involve expenditures of about US$ 137 billion on capital goods of various kinds, US$ 87 billion of which would be for the infrastructure program and US$ 50 billion would be for the upgrade and expansion of the transport fleet.

Potential. About US$ 184 billion would be spent on construction materials, spare parts and other goods required for the proposed investment and maintenance activities.

Consultancy Services. In the case of expenditures on capacity building and technical services, about US$ 11.7 billion would likely be spent on international and domestic consultants. To facilitate development of the domestic consultancy industry, business organizations in Nigeria might consider development of lists of qualified national firms and individuals. It should also be possible to encourage the use of sub-contracting to domestic consultants in the event that contracts are awarded to international firms. “Buy Naija-Create Employment”

Expenditures on Capital Equipment. The US$ 335 billion of proposed capital expenditures would include purchases of about US$ 50 billion for additions to the transport fleet of the country. The prospect of US$ 50 billion of expenditures on transport equipment may provide substantial impetus to the further development of domestic manufacturing capacity for assembly of the equipment, along with supply of some components by domestic manufacturers. This part of the program may provide substantial opportunities for import replacement with
expanded domestic capacities for domestic assembly of such equipment and for supply of range of components for these vehicles.

**Construction Materials and Spare Parts.**
The proposed Action Plan includes about US$ 115 billion of construction materials for the civil works components of the program, such as quarried materials for road and other construction, cement, asphalt, steel rebars, lumber and other construction materials, and a wide range of fixtures, all of which would offer domestic suppliers of these materials with enhanced business opportunities. The prospective supply of materials, spare parts and other goods represents a major opportunity for the domestic business community in Nigeria.

Support to be put in place by the Government. The Government will need to develop a range of programs to ensure that a substantial part of the benefits do accrue to domestic business.

- A widely used approach to promote the role of small and medium business activities relies on the use of a network of business development centers (BDCs) throughout a country. These centers provide training and support for small and medium business entities to bid on and implement construction and or maintenance contracts.

- Initiatives can also be taken to ensure that a reasonable portion of the infrastructure-related procurement by government, donors, and private investors is awarded to qualified domestic suppliers of goods and services. Procurement policies for various parts of the infrastructure program will need to address the following issues: (i) the choice of standards for civil works and goods and materials; and (ii) the extent to which local materials can be used and whether their technical specifications comply with contract requirements. Close collaboration with the Standards Organization of Nigeria (SON) will be required as well as attention to the capacity of SON to respond effectively to these challenges. A clear set of policies for promoting local content in public infrastructure procurement will be needed.

- Ease of doing business needs to be improved and initiative taken that address major concerns of the business community; for example, the amount of time required to start a business, and the amount of time required to obtain construction permits, the complexities associated with registration of property and issues related to access to land, tax rates, payment of taxes and cross-border trade.

### 6.2 A Framework Supportive to PPP

As noted in the foregoing discussion, a key requirement for successful implementation of this ambitious program is close attention by the Government to further improvements in the climate for private investment in Nigeria, particularly as it relates to infrastructure services.

The Infrastructure Concession Regulatory Commission (ICRC) is tasked with providing guidelines and regulations that will create an enabling environment for the private sector to enter into partnerships with Government in the financing, operation and management of infrastructure and allied services. The ICRC Act 2005, which established ICRC, contains two main provisions: (i) provides for any government agency to enter into a PPP arrangement with a private sector party to develop, finance, construct, maintain and/or operate infrastructure services or facilities; and (ii) establishes the ICRC to monitor the PPP transactions. Since its inauguration in November 2008, the Commission has developed the National Policy on PPP and associated best practice guidelines and procedures for the effective use of PPP-type projects. The next step in the development of the PPP framework is the standardization of policy decisions across sectors to support consistency of approach and reduce the cost of project development. Actions on this front typically involve the following:

- Standardization of detailed procedures for identifying, evaluating and processing PPPs.
- Operational manuals and guidance notes.
- Project contracts and contract clauses.
- A range of other documentation.

Consideration might be given to the creation of a PPP project development fund (PDF). It could be funded by the Sovereign Wealth Fund in partnership with the international donor community. An allocation of say US$ 1 billion of ODA for transaction advisory services, with the balance coming from the SWF, would provide a valuable independent, off-budget means for funding these activities.
6.3 Key Administrative Reforms

Some important administrative reforms affecting all infrastructure sectors may be considered to facilitate the implementation of the Action Plan over the 2010-20 period. They include in particular:

- Developing an integrated national planning framework for infrastructure delivery, a reinforced capacity for monitoring the performance of state-owned infrastructure services companies, and consistent funding mechanisms across infrastructure sectors.
- Revising the mechanism for the allocation of budgetary funds to infrastructure projects. The drip-feeding of projects by the annual budget, whereby limited funds available through the budget for capital works are spread across a large number of projects results in many abandoned projects, with very few completed, often at multiples of the original cost and with major extensions in the completion time. The funding from the budget should guarantee full funding of the selected projects and ensure close monitoring of expenditures and progress.
- Simplification of administrative structure involved in infrastructure. One of the striking features about the institutional arrangements for infrastructure in Nigeria is the large number of government entities that have responsibilities for particular parts of the infrastructure network and or the provision of infrastructure services. There are at least 52 ministries and agencies at the federal level with such responsibilities, including 14 entities that have responsibilities for various aspects of power supply, and almost as many with responsibilities for ports and waterways, civil aviation, and gas pipelines. The arrangements for inter-ministerial coordination and their effectiveness for individual sectors is a matter of some concern. A similar issue arises with respect to coordination across sectors at the national level and between national and state entities with responsibilities for infrastructure facilities and services. There are 36 State Ministries of Works (SMW) that are in charge of implementing state and local government level urban road projects. There are also 36 state ministries with responsibilities for water resources and another 36 with responsibilities for utilities, including power supply. However, many of these ministries are poorly equipped, understaffed at senior levels and often lack funding and skills. The administrative structure in charge of infrastructure at the federal and state level should be simplified.
There are, however, two key assumptions for this vision to materialize:

- A substantially higher level of investment in the non-oil economy will be required in the decade ahead. Total fixed investment in the economy would increase from about US$ 57 billion in 2010 – equivalent to 24.7 percent of GDP – to about 32 percent of GDP during 2015-20 and remain at this level thereafter. Total investment in infrastructure, which is estimated to have been equivalent to about 2.2 percent of GDP in 2010, would increase steadily to a peak of about 12 percent of GDP by 2016, after which it would decline to about 9.6 percent of GDP by 2020.

- The production of crude oil is assumed to remain relatively stable in the decade ahead, increasing from about 2.5 million barrels per day in 2010 to 2.7 million barrels a day by 2020. At 2010 constant prices, the value of oil production is projected to remain in the range of US$ 80-90 billion a year. The Production of dry gas is expected to expand from about 1.02 billion cubic feet a year in 2010 to about 6.38 billion cubic feet a year by 2020. The value of gas production at current and projected world prices is expected to increase from US$ 4.6 to US$ 21.8 billion by 2020 (at 2010 constant prices). The total value added by oil and gas is projected to increase from US$ 97 billion in 2010 to about US$ 104 billion in 2020.

The structure of Nigeria's GDP will change significantly over the 2010-2020 period:

- The agricultural sector which grew at an average of about 5 percent a year during 2010-2012 would continue to average 5 percent a year for the decade as a whole. As a result, value added by agricultural activities, which accounted for 53 percent of non-oil GDP in 2010, would decline to about 34 percent by 2020.

- The industrial sector which accounts for only 5 percent of the non-oil GDP of the country (of which manufacturing activities account for about 62 percent and building and construction for about 33 percent, and non-oil mining for the remaining 5 percent) grew at an average of 9.2 percent a year during 2010-12. In response to successful implementation of the proposed development program, the industrial sector will continue to grow rapidly by about 15 percent a year. The industrial sector’s share of non-oil value added is projected to increase to about 9 percent by 2020.

- The services provided by the infrastructure sectors of the economy have been the fastest growing component of non-oil GDP in recent years. During 2010-2012, for example, the average growth of these services in real terms was about 17 percent a year. These activities currently account for about 5 percent of non-oil GDP. Driven
by the large amounts of investment in infrastructure proposed in the Infrastructure Action Plan, the value added by these activities is projected to grow by an average of about 15 percent a year during 2011-20. The sector would therefore account for about 7 percent of non-oil GDP by 2020.

- The other service industries, dominated by wholesale and retail trade, finance and insurance, real estate and other business services account for about 37 percent of non-oil GDP. They are projected to grow at about 13 percent a year in real terms during 2011-20 and by 2020 account for 49 percent of the non-oil GDP of the country.

7.2 Direct Benefits

The proposed US$ 448 billion of expenditures for the infrastructure sector development and maintenance will have a substantial impact on demand for labor in the domestic market, poverty and public finances.

**Employment.** The proposed program for infrastructure would involve expenditures of about US$ 126 billion for labor services. This will provide employment for 4.5 million workers.

**Poverty Reduction.** Improved infrastructure play an important role in the reduction of poverty through its direct impact on incomes, and its impact on the non-income aspects of poverty by contributing to improvements in health, nutrition, education and social cohesion. There are links between infrastructure, growth and poverty reduction. An essential complement to the infrastructure program will be the development of programs for health and education services that take full advantage of improved access to transport services, electricity and communications, especially in rural areas. It may be possible to bring about a 30 percent reduction in the incidence of poverty by 2020, which would mean that a little more than 50 percent of the population would be above the absolute poverty level. While the incidence of absolute poverty in Nigeria would decline substantially, the total number of people in absolute poverty would only decline from 108 million in 2010 to 98 million in 2020. Continued strong growth throughout the 2020s could then lead to a further reduction in the incidence of poverty to perhaps 30 percent of the population by 2030. This would bring the total number of people in absolute poverty down to about 80-90 million.

**Business Opportunities.** The proposed US$ 350 billion of development expenditures for the program is expected to generate substantial opportunities for the domestic business community to supply goods and services for construction and maintenance of these facilities and for the provision of a substantially larger range of infrastructure-related services in the various sectors.

- The program would involve expenditures of about US$ 137 billion on capital goods of various kinds, US$ 90 billion of which would be for the infrastructure program and US$ 50 billion would be for the upgrade and expansion of the transport fleet. A substantial portion of this equipment would be imported, given the limited capacities of domestic industry for the manufacture of capital equipment. However, there are likely to be considerable opportunities for assembly of equipment in Nigeria and the manufacture of some components for the road transport fleet, for example.
- About US$ 184 billion would be spent on construction materials, spare parts and other goods required for the proposed investment and maintenance activities, including about US$ 115 billion of construction materials for the civil works components of the program. In addition, the proposed maintenance program for 2011-20 includes an estimated US$ 66 billion for spare parts and other goods and material.
- The proposed program would translate into a substantial increase in demand for domestic and imported goods and services. The challenge will be to promote a strong domestic response to ensure that a large share of these goods and services is supplied by the domestic business community rather than having a substantial part of these expenditures used for the purchase of imported goods and services. The Government will need to address the potential constraints in the domestic market to the effective implementation of the proposed Infrastructure Action Plan: that is; (i) lack of direct support for development of domestic business capacities; (ii) shortcomings in the operating environment for business; (iii) current and prospective skills shortages in the labor market; (iv) limitations on access to finance and the need for reform in the domestic credit markets; and (v) trade policies that result
in high input costs for a range of domestic industries that can undermine competitiveness with imports.

**Public Finances.** The sustained strong growth of the non-oil economy would also provide the opportunity for a major increase in the general government revenues of Nigeria. Overall Government revenue averaged about 17 percent of GDP on a PPP basis in 2010-12 – an overall performance that is broadly in line with that of other lower middle income countries but non-oil revenues were only about 6 percent of the GDP – a performance level that is well below that of other lower middle income countries.

With revenues from oil and gas projected to be relatively stable in real terms in the decade ahead, the ratio of oil and gas revenues to GDP on a PPP basis declines steadily from about 11 percent in 2010-12 to about 6 percent by 2020. One of the major challenges in the decade ahead, therefore, is to improve the non-oil revenue performance of the country. The projected sustained strong growth of the non-oil economy offers considerable opportunity to achieve this objective, with increased revenues from income taxes, international trade and a range of other sources of domestic revenues. Total revenues of the government are projected to increase to about 25 percent of GDP by 2020. This level of revenue performance is well aligned with the performance of other lower middle income countries. However, with the decline in relative importance of oil and gas revenues, it is the non-oil economy that emerges as the primary source of government revenues in the decade ahead. Non-oil revenues are expected to increase to about 18 percent of GDP by 2020.

### 7.3 Alternative Scenarios

Implementation of a program of the proposed magnitude inevitably faces many risks and uncertainties. The risks and uncertainties relate to the design, funding and implementation of the proposed program. Two alternative scenarios to the High Growth Scenario presented above are considered:

**Baseline (low) scenario.** The proposed ramp up in total investment and development expenditures for infrastructure does not occur because of a combination of difficulties related to mobilization of funding and building public capacities for program implementation. In this case, overall investment levels remain in the range of 23-25 percent of GDP and investment in infrastructure remains at the 2010-2012 average of 4 percent of GDP level. In this scenario, total capital spending on infrastructure development amounts to about US$ 220 billion during 2011-20, compared with US$ 335 billion in the High Growth Case. The reduced size of the infrastructure program would have major consequences for the performance of the non-oil economy and for the prospects for productive employment opportunities and improved standards of living. The current difficulties with the infrastructure network of Nigeria would persist for a much longer period, including slower progress in improving the quality of the road network and expanding access to markets and basic services for rural communities, and creation of reliable power supplies at reasonable cost.

**Intermediate Case with Constrained Implementation of the Proposed Infrastructure Program.** In this scenario, the full implementation of the proposed Infrastructure Action Plan is constrained by a combination of difficulties related to mobilizing the required funds and slow progress in building implementation capacities in the public sector at Federal, State and Local Government levels. In this scenario, it is assumed that full implementation of the proposed infrastructure program is completed by 2025. The level of fixed investment in the non-oil economy is about 30 percent of GDP for much of the 2011-20 period. From the standpoint of macroeconomic management, this level of investment looks reasonable and manageable. However, the non-oil fixed investment is equivalent to about 41 percent of non-oil GDP. It represents a much larger share of non-oil GDP because a substantial share of its financing comes from oil revenues rather than savings generated within the non-oil part of the economy. This relatively high level of investment spending in the non-oil economy will create excess demand for goods and services that may translate into cost-push inflationary pressures.
EXISTING ROAD TRANSPORT NETWORK OF THE WESTERN AFRICAN REGION

EXISTING ROAD TRANSPORT NETWORK OF NIGERIA
PROPOSED TRUNK ROAD TRANSPORT NETWORK OF NIGERIA

EXISTING RAILWAY NETWORK OF NIGERIA
AGRO-ECOLOGICAL ZONES OF NIGERIA

EIGHT DESIGNATED HYDROGEOLOGICAL AREAS OF NIGERIA
GROUNDWATER RESOURCES OF NIGERIA

LOCATION OF EXISTING MAJOR DAMS IN NIGERIA
CHAD RIVER BASIN

DISAPPEARANCE OF LAKE CHAD

Source: This collection of maps has been drawn after a series of satellite images provided by NASA Goddard Space Flight Center. Map graphic created by Kool Map Company, Seattle.
GENERAL MAP OF THE WESTERN AFRICAN REGION

ADMINISTRATIVE MAP OF NIGERIA
EXISTING MAIN AIRPORTS OF NIGERIA
EXISTING TRANSMISSION GRID IN NIGERIA

Legend
- Existing Power Lines
- National Boundary
- State Capital
- Towns, Villages

Distribution Zones
- Abuja
- Benin
- Edo
- Ewep
- Kaduna
- Yola
- Port Harcourt

SOURCES: Natural Earth, African Development Bank.

Please note: The boundaries and the names shown on this map do not imply official endorsement or acceptance by the African Development Bank.