

THE PRESIDENCY  
FEDERAL REPUBLIC OF NIGERIA

# ROADMAP FOR POWER SECTOR REFORM

(A CUSTOMER-DRIVEN SECTOR-WIDE PLAN  
TO ACHIEVE STABLE POWER SUPPLY)

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# Foreword

BY THE PRESIDENT & COMMANDER-IN-CHIEF  
FEDERAL REPUBLIC OF NIGERIA

The availability of reliable Electric Power to the homes and businesses of our citizens has been one item in our national life that we have approached with so much hope and yet experienced so much frustration over the past decades. Various regimes, in the distant past, paid little attention to the sector but in the recent decades, subsequent regimes have put in billions of naira to reverse the neglect and mismanagement which has characterised the sector.

As President and Commander-in-Chief of the Armed Forces, I and my Vice President, Arc. Namadi Sambo, GCON, are conscious that what we do with the Nigerian electricity supply industry will go a long way in determining whether Nigeria remains in darkness or joins the rest of the world in the race for development. Our commitment is to bring an end to our nation's stunted growth and usher in the fresh air of prosperity by pursuing a new era of sector-wide reform which is driven by improved service delivery to every class of customers in the Nigerian electricity sector.

The full implementation of the Electric Power Sector Reform has been a key priority for this administration. We established the Presidential Action Committee on Power (PACP) with a view to eliminating red tape and the often over-bureaucratic and inefficient nature of decision-making in government. I commend all members of the PACP, including key stakeholders and heads of institutions.

The Presidential Task Force on Power is the engine room that drives the vision of the PACP. The Task Force has the mandate to develop the Roadmap and provide monitoring to ensure effective implementation of the plan. Their activities will introduce a greater degree of



transparency to the way in which we implement the reforms and greater accountability on the part of those responsible.

In developing this Roadmap we have built on the solid foundation laid down in 2001/2002 by the adoption of the National Electric Power Policy, and in 2005 with the promulgation of the Electric Power Sector Reform Act. This Roadmap heralds our advance to the final and very important stage in the reform process. This is the stage where we ensure that the fundamental changes to the ownership, control and regulation of the sector envisaged by the legislation are achieved and the downstream benefits are realised.

In the same way that the reforms in the telecommunications sector paved the way for the benefits we all enjoy today, we believe that with diligent implementation and meticulous application of what this Roadmap provides, we will see an end to the chronic electric power supply shortages we know too well, and witness the birth of a modern, efficient, customer focused, private sector driven electricity supply industry.

We have the will. This Roadmap shows the way.

Dr. Goodluck Ebele Jonathan, GCFR  
*President and Commander-in-Chief of the Armed Forces  
Federal Republic of Nigeria*

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## Introduction and Executive Summary

The growth, prosperity and national security of any country are critically dependent upon the adequacy of its electricity supply industry. Indeed the link between electricity supply and economic development is such that the health of the industry is a matter of deep and personal concern to all citizens. Nigeria is no exception. Over the past two decades, the stalled expansion of Nigeria's grid capacity, combined with the high cost of diesel and petrol generation, has crippled the growth of the country's productive and commercial industries. It has stifled the creation of the jobs which are urgently needed in a country with a large and rapidly growing population; and the erratic and unpredictable nature of electricity supply has engendered a deep and bitter sense of frustration that is felt across the country as a whole and in its urban centres in particular.

Electricity consumers and the citizenry as a whole demand a fundamental reversal of the long and debilitating malaise which has blighted the industry and, in doing so, bridled the tremendous energy and creativity of this great and populous nation. More particularly they demand real and *immediate* improvements in service levels.

In response to this demand, the Federal Government will not pretend that the task ahead will be an easy one. But it is determined to root out the canker which lies at the very heart of the industry. More particularly, the Federal Government has stressed the need to return to the task of pursuing the fundamental changes to the ownership, control and regulation of the sector that have been outlined in the National Electric Power Policy (2001) and enshrined in the Electric Power Sector Reform (EPSR) Act of 2005.

To meet our Vision 20:2020 target of 40,000MW will require investments in power generating capacity alone of at least US\$ 3.5 billion per annum for the next 10 years. Correspondingly large investments will also have to be made in the other parts of the supply chain (i.e. the fuel-to-power infrastructure and the power transmission and distribution networks). These sums cannot and will not be funded and directed by the Federal Government. Rather, central to the development of the sector will be the need to incentivise the private sector to partner with government in this endeavour. At the same time, however, the Federal Government is acutely aware that improvements in service levels cannot wait until the industry has been commercialised. The Government is, therefore, taking active steps to ensure modest but genuinely realisable improvements in the amount and quality of electricity supplied to customers in all regions of the country.

In summary, this Roadmap outlines our plan to accelerate the pace of activity with respect to reforms already mandated under the EPSR Act and, at the same time and in support of this, a renewed drive to improve on short term service delivery.

## 1.0 Fulfilling the Imperative of the Electric Power Sector Reform Act

Fortunately, key early milestones have been achieved in the implementation of the EPSR Act. The creation and unbundling of the Power Holding Company of Nigeria (PHCN) have been important first steps. This now needs to be followed by the corporatisation, commercialisation, and eventual privatisation of the successor companies, the inflow of a large volume of private sector investment through the creation of new power generation and distribution entities and the subsequent development of a competitive electricity market. At the same time, a realistic, properly considered and sustainable plan for service delivery in the short and medium term that dovetails with the structural reform imperative must be pursued.

Over the coming year, the Federal Government will fast track these structural reforms by:-

- removing obstacles to private sector investment;
- clarifying the government's strategy on the divestiture of the PHCN successor companies; and
- reforming the fuel-to-power sector.

### 1.1 Removing obstacles to private sector investment

The sections below outline the steps which the Government is taking to catalyse the inflow into the industry of private sector investment and accompanying managerial and technical expertise.

**It is important to note, however, that the participation of the private sector is not an *end in itself*. On the contrary, it is only the *means* to the ultimate objective i.e. the urgently needed improvement in the service levels experienced by all electricity consumers.**

***The establishment of an appropriate pricing regime.*** For the sector to be financially viable throughout the value chain, the end-user tariff must at least be at a cost-reflective level. However, the tariff as it now stands is significantly below what is necessary for the sector. As a result, not only is PHCN continuously unable to meet recurrent expenditure requirements, it must continually beg government for additional monies for short term and long term capital expenditure. Further, and more importantly, without a pricing regime that supports financial viability in the sector, it simply makes no sense for a private sector operator to come into the market.

The Nigerian Electricity Regulatory Commission will, therefore, be undertaking a major review of the tariff regime which will be completed before the end of the first quarter of 2011 with a view to replacing the national uniform tariff with a new genuinely cost-reflective ceiling on end-user tariffs.

However, to protect against "rate shock" and to ensure that low-income consumers are provided with the "lifeline" tariff envisaged by the framers of the original power sector

reform policy, there will also be much greater price differentiation and the introduction of an inclining block tariff whereby the rate paid for electricity varies with a given level of consumption.

***The establishment of a bulk purchaser.*** In accordance with the EPSR Act, the electricity industry needs to transition to a new model, where a government owned bulk buyer carries out contract management and bulk trading (on behalf of the distribution companies<sup>1</sup>) until such time as the industry has developed the settlement, accounting, managerial and governance systems required for successful bilateral contracting.

The Nigerian Bulk Electricity Trading Company PLC has now been incorporated and over the next two months this entity will be appropriately resourced and established, with the expectation that by October 2010 it will be ready and able to start negotiating appropriate power purchase agreements not just with successor generating companies and existing independent power producers (IPPs) but also with potential new entrants into the power generating market.

***The provision of FGN Credit Enhancement.*** In entering into a power purchase agreement (PPA), independent power producers (IPPs) will also require that there is a creditworthy counterparty at the other side of the table. However, it could take up to four years before some of the distribution companies become commercially viable and are fully credit-worthy entities. Therefore, in order to accelerate private sector investments in power generation, the Ministry of Finance is reviewing a set of options through which the Federal Government may provide credit enhancement to the bulk purchaser that will enter into PPAs with the successor generation companies and IPPs.

As it will take a few years for IPP projects to be up and running, by which time the structural reform process will have gained significant traction, the liability to which the Federal Government may be exposed, were it to provide some form of backstop to the PPAs, will be negligible.

***Creating an efficient and motivated workforce.*** Progress with the reforms has, hitherto, been frustrated by the operational and financial risks to potential acquirers of successor companies posed by the government's failure to reach an agreement with the labour unions on the settlement of outstanding arrears (of salaries, pensions and other benefits) and on severance pay.

Recognising that the faithful implementation of the reforms will result in a much larger, more dynamic sector with industry participants enjoying significant profits, consumers enjoying better service delivery and, most importantly, workers enjoying better conditions of service; the Federal Government has recently engaged in active dialogue with the leaders of the labour unions. This dialogue is finally bearing fruit. Indeed, the Government's expectation is that a comprehensive agreement on all outstanding issues will have been negotiated by the year end.

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<sup>1</sup> N.B. The establishment of the bulk trader will not impose a "single buyer" model upon the industry because the distribution companies, to the extent that they are able to, will be allowed to procure power bilaterally alongside the bulk trader.

***Operationalising the Nigerian Electricity Liability Management Company (NELMCO).***

NELMCO was established as a government Special Purpose Vehicle to assume and manage extant assets, liabilities and other obligations that could not be easily transferred from PHCN to any of the Successor Companies. The Federal Government is working to ensure that NELMCO is made fully operational without further delay and that any uncertainties with regard to the transfer of residual liabilities are removed. In the process thereof, the Federal Government will also make clear to investors the complementary roles to be played (in the management of legacy liabilities) of both NELMCO and the Bulk Purchaser.

***Contracting out the management of the Transmission Company of Nigeria (TCN).***

Investors will be reluctant to make large-scale investments in the upstream and downstream sectors of the electricity industry unless they are confident that commensurate investments in the midstream sector will also take place. As such, the management of TCN will be contracted out to a private company which has both the requisite project management and technical expertise. The tender process for this has commenced.

***Clarifying and strengthening the licensing regime.*** Electricity asset investments involve high fixed costs with a long duration and investors expect the life of the licence to be more or less in line with the period required to recover their investments, typically 20 – 25 years. However, the EPSR Act provides for licenses that shall not exceed ten years duration although NERC may extend, on a rolling basis, the validity of the licenses for additional five year periods. To provide greater comfort to investors, mechanisms are being developed that will assure them of renewal/extensions of their license provided they meet the necessary conditions.

***Strengthening the Nigerian Electricity Regulatory Commission.*** NERC plays a critical role in issuing operating licences and regulating the sector. More importantly, it provides confidence that a level playing field will subsist and that rules will be followed and enforced. In recognition thereof, the Government has taken decisive action to resolve the leadership vacuum at NERC and establish a credible leadership therein.

**1.2 Clarifying the government's strategy on the divestiture of the PHCN successor companies**

Whilst the government is committed to resolving each of the specific obstacles to private sector investment outlined above, it is also conscious that potential investors in the sector are looking for a clear indication of the government's overall strategy or "philosophy" in respect of the divestiture of the 18 successor companies. Accordingly, the divestiture approach set out in this Roadmap can be summarised as follows:

**The hydro power generating plants.** The strategy adopted by the BPE is to grant concessions for the operation of Kainji, Jebba and Shiroro. This approach is principally predicated on the magnitude of the capital requirements and water rights issues associated with these plants; but it also reflects the link between the sustainable management of hydro power and the development of the country's agricultural resources.

**The thermal generating plants.** The PHCN successor thermal generating plants will be privatised via the sale of a minimum of 51% equity to core investors that clearly demonstrate the technical and financial ability to operate and expand each plant. Care will be taken, by working closely with NERC, to ensure that a monopoly or oligopoly of market power in the generation sector is not acquired through these divestitures. The NIPP plants will be managed under Operation and Maintenance (O & M) contracts now being prepared by the Niger Delta Power Holding Company (NDPHC), the parent company of these plants. The mode and strategy for their subsequent divestiture will then be communicated once these plants have been commissioned.

**The Transmission Company of Nigeria.** The Transmission Company of Nigeria will be handed over to a credible private sector company under a five year management contract. The key, therefore, to the successful commercialisation of the national grid is the appointment of a contractor with the skills required to manage the huge and complex programme of construction and rehabilitation that will be required over the coming decade.

**The Distribution Companies.** All the distribution companies are expected to be privatised, based on a core investor sale of a minimum of fifty-one (51) percent of the government's equity in the companies. The sale methodology will emphasize the reduction of technical and commercial losses and increased efficiency of collections. Accordingly, in addition to their offers for ownership of a minimum of fifty-one percent of the companies, bidders will be expected to submit proposals that reflect information on their strategy for meeting the efficiency targets that will be specified in the Request for Proposals.

### 1.3 Reforming the fuel-to-power sector

Finally, the Federal Government is also conscious of the need for complementary reforms in the upstream fuel-to-power sector and in the gas industry in particular. Significant reforms of the gas industry have already taken place over the past 12 months and these reforms should have a direct and positive impact on the electricity industry in the years to come. Nevertheless, during the course of the coming year, the Government will introduce additional incentives to attract the tens of billions of dollars of private sector capital which the industry will require over the coming decade.

## 2.0 Improving Service Delivery Throughout the Transition

Whilst it is the Government's intention that the Nigerian Electricity Supply Industry should be principally owned and controlled by the private sector, this transition cannot happen overnight. Thus, *for an interim period*, the Federal Government of Nigeria – through its parastatals – will continue to retain direct accountability for service delivery across large parts of the electricity value chain. In view of the above, consumers (and the citizenry as a whole) have a right to know what level of service delivery is expected of these parastatals during the transition period.

Moreover, the Federal Government recognises that electricity customers are keen to see *immediate* improvements in service levels and will not be satisfied with the mere promise that these improvements will materialise *after* the sector has been reformed. Thus,

throughout the reform period, the Government is determined to apply its energies with equal and commensurate force to the service delivery imperative. More particularly, our focus is on service delivery that is sustainable; service delivery that is carried out in a well-managed and monitored manner and for which outputs can be properly evaluated; and service delivery for which those directly responsible can be held truly accountable. In addition, as a radical departure to the established way of doing things, we are committed to adopting a more participatory and inclusive approach to the reforms. This will mean carrying the general public along every step of the way by ensuring that progress against objectives will be made clear and transparent.

In the short term, we must clearly ensure a substantial increase in the total quantum of power delivered to electricity consumers across the country. In this regard, we are committed to ensuring that the average number of hours of electricity supplied to consumers increases noticeably over the coming year.

The second and equally important objective is to ensure that the supply of power will not only be significantly greater than ever before but that it will also be much less *erratic and unpredictable*. To that end, the targeted increases in generation, transmission and distribution capacity will be combined with a deliberate change in the practices of the System Operator. This change will mean that instead of despatching all the available generating capacity all of the time, the System Operator will aim to keep power generation and distribution *steady* and relatively *predictable*. In addition, the Government is also urging the System Operator and the various distribution companies to undertake more strategic and more predictable load-shedding practices.

In the medium term (by December 2013), even though there will by then be a substantial reduction in the Government's funding and managerial direction of significant elements in the electricity value chain, our expectation is that the total quantum of power delivered to electricity consumers across the country should be at least *twice the current level*. This ambition reflects expected outputs from the planned completion of projects *which have already been budgeted* and for which the government will retain direct accountability, namely:

- the completion of all the overdue NIPP projects (for generation, transmission and distribution);
- the completion of the outstanding (and already budgeted) PHCN projects; and
- the completion of the outstanding (and already budgeted) NGC investments in the gas supply and transportation industry.

Our specific objectives and associated activities are spelt out in detail in this Roadmap and encompass goals in the four key areas of fuel-to-power, generation, transmission and distribution. In addition, there are auxiliary objectives which cut across all four sectors and these, include in particular: the compilation, processing and disclosure of industry statistics which are essential for strategic planning; and the development, training and incentivisation of the human capital upon which the success of the whole industry depends.

## 2.1 Fuel-to-power

In view of the high capital costs and long lead times required to develop commercial power generation through solar, wind, nuclear and biomass, the Federal Government will focus its development efforts on hydro, coal and natural gas. The potential of natural gas, in particular, will be prioritised and incentives will be provided to investors to exploit this resource to its fullest potential.

In the short term, work to implement the National Gas Masterplan will be accelerated. In the period up to April 2011, it is expected that there will be enough gas supplied to power producers (circa 1,636 mmscfd) to support the targeted increase in actual generation capacity of circa 7,000 MW.

In the medium term, available generation capacity is projected to outstrip the available gas supply to power producers. As such, additional support and incentives will be required to attract private sector investment into the gas sector so as to enable international oil companies and other investors to produce stranded gas locked up in various fields especially in the eastern axis.

## 2.2 Generation

In the short term, the Federal Government is committed to rehabilitating circa 1,000 MW of generating capacity at existing PHCN power stations and adding an additional 1,266 MW of generating capacity from new NIPP power stations.

The strategy from the beginning of next year will be to maintain for every part of the country, the current allocation of power, and then begin to allocate a significant portion of the *additional* power that will come from the NIPP and other IPP projects to key industrial cities in the country. Where possible, additional power from other IPPs will be domiciled in the local domain where the power is produced.

In the medium term (up to December 2013), we can expect: a modest increase in the total power generation capacity of the existing PHCN power stations (which would bring the total to just under 4,500 MW); the addition of 4,775 MW from the NIPP plants; and a substantial (3,300 MW) increase in power generation capacity from IPPs all by December 2013. As such, the medium term expectation is that 14,000 MW of power generation capacity will be available by December 2013.

Although the Government is determined that the vast majority of all new power plants should be financed and built by the private sector, it also acknowledges that there is a case for some limited involvement by the FGN in the financing of renewable forms of power generation e.g. hydro (or other renewables) and in stimulating production of power from coal.

## 2.3 Transmission

To ensure that this increase in generating capacity is not left stranded for lack of evacuation capacity, there would be a need for a 30% increase in the “true deliverable” transformation capacity of the country’s 330kV network between July 2010 and April 2011 above its current limit of circa 4,500 MW equivalent.

In practice, however, it is highly unlikely that an increase of this magnitude will be realisable by April 2011. On the contrary, the Government’s projected targets for April 2011 are that the “true deliverable” transformation capacity will rise by just over 10% to about 5,000 MW equivalent (even though the total nominal 330kV transformation capacity is projected to rise to 5,995 MW equivalent).

These figures reflect the fact that the transmission network is still a weak link in the electricity supply chain. Moreover, even with the completion of the extant PHCN and NIPP transmission projects (for which funds have already been provided), the gap between generation capacity and the capacity of the grid is expected to widen considerably over the coming three years.

It is all the more imperative, therefore, that new investments are pushed forward as rapidly as possible. To that end, the TCN management contractor will be responsible for significant investments in the expansion, reliability and stability of the network infrastructure. In addition, the Federal Government plans to build a new super transmission network, which amongst other things will help to evacuate power from the proposed Mambilla hydro power plant.

Given the Government’s commitment to the introduction of a genuinely cost-reflective tariff, a substantial portion of these capital investments will be recovered through the revenues generated by the electricity market itself i.e. by the transmission use of system charges paid to the Transmission Company of Nigerian (TCN).

## 2.4 Distribution

In the run-up to the privatisation of the distribution companies, the Government will be working hard to enhance the operational and commercial performance of the distribution companies. Not only will these efforts improve the quality of service experienced by electricity customers but they will also enhance the value of the distribution companies and the prices which the government is able to realise upon their divestiture.

More particularly, the Government’s short term targets are to:

- increase the capability of the distribution network by circa 20%;
- reduce aggregate distribution losses (technical and non-technical) by at least 5% by April 2011; and

- secure a noticeable increase in the average number of hours of electricity supplied to consumers by April 2011.

To a large extent, the achievement of these targets will be made possible through the completion of the on-going NIPP and PHCN projects, the budgets for which have already been provided. Nevertheless, there are a number of new projects which need to be funded in order to secure the delivery of the Government's short term targets and these are currently being identified by the Presidential Task Force on Power.

The Federal Government is also targeting an increase in the average monthly revenue collection capability of the Nigerian Electricity Market from the current N10bn to N17.6bn by April 2011. The keys to this improvement are the targeted increases in power generation; the targeted reductions in technical and non-technical losses; the introduction of better customer care service programmes; and improvements in collection efficiency. With regard to the latter, the Government's target is to increase the total collection efficiency of the industry by at least 5% by April 2011.

To ensure that the performance targets (both operational and commercial) are reached within the time periods outlined above, the Presidential Task Force on Power has also developed an incentive scheme for the staff of the distribution companies which will offer rewards for good performance and sanctions for poor performance.

With regard to the medium to long term horizon, the Government intends that full responsibility for the operational effectiveness of the distribution companies should shift from the Federal Government to the private sector no later than 2011. Nevertheless, the actions and decisions of the Federal Government will continue to exert a significant impact on their commercial effectiveness. More specifically, the Government acknowledges that its policy decisions on electricity tariffs will have a direct and critical effect on the financial viability of the privatised distribution companies and (as noted earlier) it is committed to the introduction of a genuinely cost-reflective tariff which will secure the financial viability not just of the distribution companies but of the sector as a whole.

## **2.5 Industry-wide data compilation and dissemination**

Good strategic planning in the power industry, whether by the private sector or the public sector, is critically dependent upon the provision of system-wide industry information. But it is not just a matter of compiling and publishing reams of data. On the contrary, all participants in the industry need access to data that has been properly validated, analysed, processed and "joined up".

To that end, the Federal Government will ensure that NERC develops and maintains a dedicated industry-wide data centre which will help promote sound policymaking, efficient markets, and the public understanding of the health of the industry.

## **2.6 Human capital development**

A robust Nigerian electricity supply industry requires a well-trained and properly motivated workforce. As with all other aspects of the sector, investments in human capital development have been inadequate and there has been no significant investment in focused training in the last 15 years. Indeed, much of the trained workforce is aging and nearing retirement.

The Federal Government is mindful of this fact and is working on a clear strategy to improve the competence of the existing workforce through skill enhancement and professional development programmes. This strategy will ensure the recruiting, training and retention of an effective workforce that will drive the Government's vision for the electricity industry.

This high premium that the government has placed on human capital development guides its attitude to dialogue with the labour unions. The Federal Government is committed to respect the rights of the industry's workers, prompt fulfilment of its commitment on any confirmed benefits, and maximisation of the full potentials of all workers.

Part of this strategy ensures that government pays close attention to the training infrastructure in the sector by making fully operational the National Power Training Institute of Nigeria (NAPTIN). NAPTIN, under the direction of the Federal Ministry of Power, has begun the process of developing a National Power Training Policy to ensure that the human capital needs of the sector are met.

## **2.7 Cross-sector discipline**

There are many institutions that play a role in the delivery of power in Nigeria. Some of these enterprises are outside the formal boundaries of the Nigerian electricity supply industry but their activities significantly impact the sector. It is imperative that these agencies understand the role they play and streamline their cross-sectoral interfaces to ensure efficient power delivery. For instance, the Central Bank of Nigeria and the Nigerian Customs and Ports Authorities, though not formally in the power sector, play a key role in the delivery of power sector equipment and spares.

The Federal Government is committed to ensuring increased accountability and transparency in all the processes within the power sector. Most importantly, government must be an exemplary customer and pay its bills on time. To that end, the Federal Government is determined to "lead by example" and institute rigorous discipline in the payment of electricity bills by all ministries, departments and agencies. Last, but not least, the population as a whole can play an important part in the rejuvenation of the industry. Retail and wholesale customers alike should treat their obligation to pay their bills and protect the country's power assets as a matter of sacred national duty.

## **2.8 Energy consumption efficiency**

Over the past decade, many countries have made significant progress towards greater energy efficiency in mass transportation; in building construction and design; and in domestic energy consumption habits. There are many good lessons to be learned from these best practices. Thus, over the coming months, the Presidential Task Force on Power will be contributing to ongoing work towards the adoption of a national policy on energy efficiency and conservation.

## Ch.1 – The Reform Imperative

### 1.0 Introduction

Since 2001, when the Federal Government adopted the National Electric Power Policy, the comprehensive reform and reengineering of the electricity supply industry has been central to the thinking of government. That policy outlined the following key objectives:

- to ensure a system of generation, transmission, distribution and marketing that is efficient, safe, affordable and cost-reflective throughout the country;
- to ensure that the power sector attracts private investment both from Nigeria and from overseas;
- to develop a transparent and effective regulatory framework for the power sector;
- to develop and enhance indigenous capacity in electric power sector technology;
- to participate effectively in international power sector activities in order to promote electric power development in Nigeria, meet the country's international obligations and derive maximum benefit from international cooperation in these areas;
- to ensure that the Government divests its interest in the state-owned entities and entrenches the key principles of restructuring and privatization in the electric power sector;
- to promote competition to meet growing demand through the full liberalization of the electricity market; and
- to review and update electricity laws in conformity with the need to introduce private sector operation and competition into the sector.

The Electric Power Sector Reform (EPSR) Act, which was passed into law in March 2005, gives effect to these principles and now serves as the platform for the enabling legal and regulatory framework for power sector operations in Nigeria.

Whilst previous administrations have approached these reforms with varying degrees of vigour over the last decade, the Federal Government is determined to not only implement them faithfully but to also ensure that this is done: methodically; efficiently; in a manner that ensures that the results are sustainable; and with a clear focus on value for money. More particularly, the Government acknowledges that the chronic debilitation of the industry can only be reversed through fundamental changes to the ownership, control and regulation of the sector.

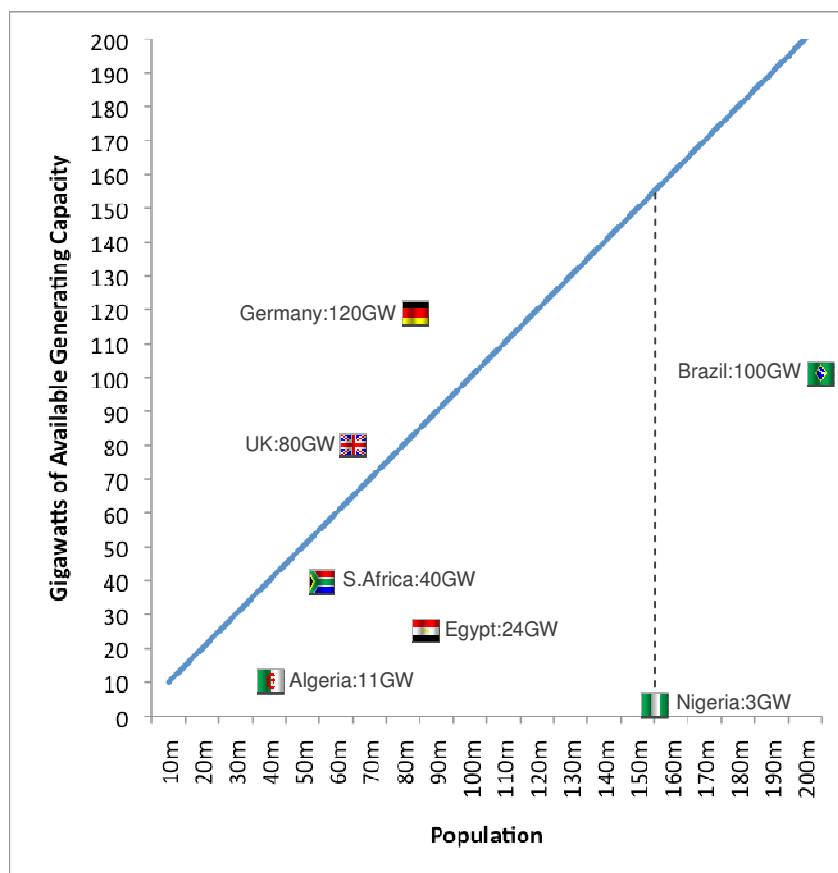
Thus, the focus of this chapter is on the reform imperative – which is the most important of all the challenges faced by the Presidential Action Committee on Power and the Presidential Task Force on Power. The sections below outline the steps which the Federal Government will be taking over the coming year to fast-track the full implementation of the initiatives outlined in the EPSR Act so that private sector investment, innovation and dynamism can catalyse the urgently needed rehabilitation and expansion of the Nigerian Electricity Supply Industry.

## 1.1 Demographics and power consumption

Nigeria is the most populous country in Africa. Its population currently stands at 150 million people and is expected to grow to 230 million by 2030.

The rule of thumb for any developed industrial nation is that at least 1 gigawatt (i.e. 1,000 megawatts) of electricity generation and consumption is required for every 1 million head of population. This rule provides a useful indicator as to the scale of the investments that will need to be made in the Nigerian Electricity Supply Industry over the coming decades. As shown in the figure below:

- Nigeria's per capita electricity consumption is amongst the lowest in the world and far lower than many other African countries.
- Nigeria's per capita electricity consumption is just 7% of Brazil's and just 3% of South Africa's.
- Brazil has 100,000 MW of grid-based generating capacity for a population of 201 million people.
- South Africa has 40,000 MW of grid-based generating capacity for a population of 50 million people.
- As at August 2010, the peak generation supplied by Nigeria's PHCN was just 3,804 MW for a population of 150 million people.



## 1.2 The immediate “out of pocket” cost of the supply - demand gap

Self-generation of electricity (from diesel and petrol generators) is conservatively estimated at a minimum of 6,000 MW i.e. more than twice the average output from the grid during 2009. Moreover, half the population (and the vast bulk of the country’s poor) have no connection whatsoever to the grid.

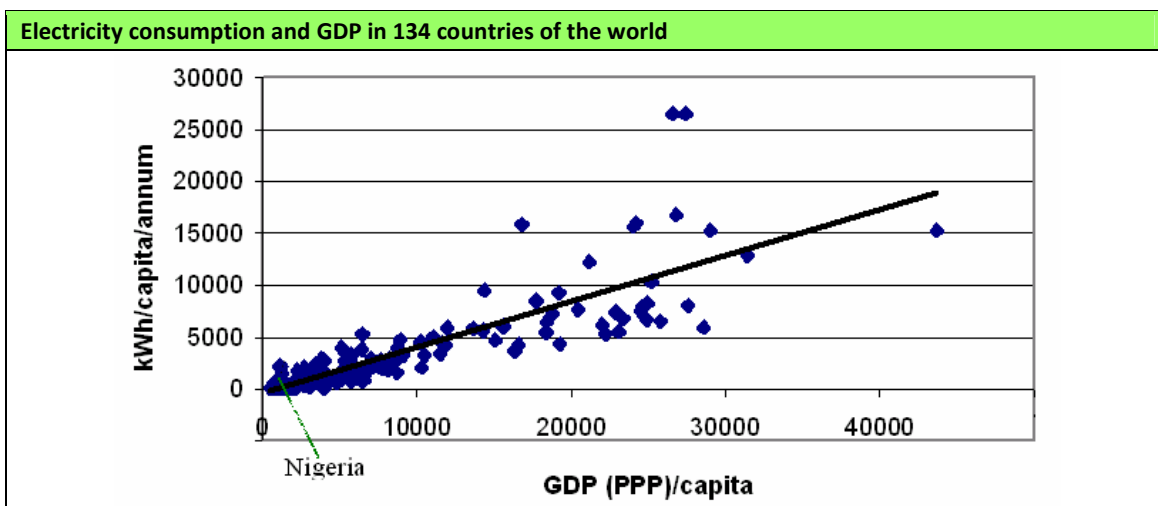
The consequence of this yawning gap between demand and supply is that, although the current regulated (average and levelised) tariff is just N8.5/kWh:

- the poor currently pay more than N80/kWh burning candles and kerosene;
- manufacturers pay in excess of N60/kWh on diesel or LPFO generation;
- everyone else pays around N50-70/kWh on self-generation (diesel or petrol).

The result is that Nigerians as a whole spend between 5 and 10 times as much on self-generated light and power<sup>2</sup> as they do on grid-generated electricity.

## 1.3 The cost, in terms of lost GDP, of the supply demand gap

Despite annual capital injections averaging \$2 billion per annum, the available capacity of Nigeria’s state-owned electricity utility has been stuck at about 3,000 MW for the past two decades. However, the cost – in terms of lost GDP – is many times greater than all the waste and leakage which have attended these capital budgets (large though these have been). This is because of the strong and inescapable link between electricity supply and economic development (as shown in the figure below).



The stalled expansion of Nigeria’s grid capacity combined with the high cost of diesel and petrol generation has crippled the growth of the country’s productive and commercial industries. If this situation were to persist, the cost by 2020 in terms of lost GDP would be in the order of 20 Trillion Naira (USD\$ 130 billion) every year (see Appendix A).

<sup>2</sup> Cf various studies by the Manufacturers Association of Nigeria; the World Bank and other development finance institutions; and independent and captive power producers.

These comparisons and trends indicate not merely what has not been invested in the Nigerian electricity industry; more positively, they indicate the massive amount of human energy, entrepreneurial spirit, socio-economic development and the accompanying accretion to the national GDP waiting to be released by the availability of electricity. The Federal Government is acutely aware of these facts and is committed to fast-tracking the reforms that will attract the vast and urgently needed investments in the electricity sector.

#### 1.4 The scale of the required investments

Investments are urgently needed all the way along the electricity supply chain, viz:

- Fuel-to-power
- Power generation
- Transmission
- Distribution

In 2005, the government launched an ambitious capital investment programme under the title of the National Integrated Power Project (NIPP). The NIPP projects comprise both gas-fired power plants and transmission lines. When completed, the NIPP projects should add nearly 5,000 MW to the country's generating capacity within the next 3 years.

However, the NIPP's contribution is a drop in the ocean compared to the investments that will be required for the country to meet the generating target which it has set itself for 2020, namely 40,000 MW.

Moreover, if this target of 40,000 MW were to be met, Nigeria's power capacity per head of population in 2020 would still be less than a quarter of what South Africa currently enjoys.

Nevertheless, to reach this relatively modest ambition (of 40,000 MW) will require investments in power generating capacity alone of at least USD\$ 3.5 billion per annum for the next 10 years. Correspondingly large investments will also have to be made in the other parts of the supply chain (i.e. the fuel-to-power infrastructure and the power transmission and distribution networks).

In summary, a total USD\$10 billion per annum would represent a *conservative* estimate of the sums that will need to be spent on the whole supply chain over the next 10 years in order to reach the modest target of 40,000 MW by 2020.

The Federal Government is convinced that it would not be ***desirable*** for such enormous investments to be funded and directed by the Federal Government (in light of the erratic and inefficient management of capital expenditures by the State-owned power company over the past two decades). More importantly, the Government recognises that it would not be ***possible*** for investments on this scale (in a single industry sector) to be made by the Federal Government.

Hence, this Administration has stressed, repeatedly, that the requisite investments in the power sector will only be achievable if the private sector is incentivised to make these investments.

## 2.0 Removing obstacles to private sector investment

The EPSR Act has already provided some of the enabling regulatory framework for private participation in the electricity industry. The EPSR Act gives legal authority and support to the restructuring of the single vertically-integrated, government owned, power sector utility. Some of the key changes provided for in the Act have already been effected, including the following:

- the creation of the Initial Holding Company (PHCN) to assume the assets, liabilities and employees of NEPA;
- the subsequent initial unbundling of PHCN into 18 successor companies and the partial transfer thereto of the assets, liabilities and staff of PHCN; and
- the establishment of the Nigerian Electricity Regulatory Commission (NERC).

But the ultimate objectives of the EPSR Act have not materialised. These goals were as follows:

- The divestiture of the successor companies (through privatisation in some cases and through concessions in others);
- The inflow of a large volume of private sector investment through the creation of new power generation and power distribution companies; and
- The subsequent development of a competitive electricity market.

These objectives have been frustrated, *inter alia*, by eight obstacles:

- the maintenance of an inappropriate pricing regime;
- the failure to establish a bulk purchaser in line with the provisions of the EPSR Act;
- the failure to address investors' concerns about the creditworthiness of the distribution companies/bulk purchaser during their eventual transition to financial viability;
- the operational and financial risks to potential acquirers of successor companies posed by the failure to reach an agreement with the labour unions on the settlement of outstanding arrears (of salaries, pensions and other benefits) and on severance pay;
- the uncertainties generated by the delay in operationalising the Nigerian Electricity Liability Management Company (NELMCO);
- the delay in contracting out the management of the Transmission Company of Nigeria (TCN);
- concerns about the licensing regime for power generation and power distribution companies; and
- the lack of continuity and consistency in pursuing the enactment and commencement of the Electric Power Sector Reform Act and subsequently, after the Act was eventually passed, in following the timelines established therein.

As described in the subsections below, the Federal Government is determined that all eight of these obstacles are removed immediately.

## 2.1 The establishment of an appropriate pricing regime

A foundation principle of the power sector reforms, as enunciated in the EPSR Act, is that for the sector to be financial viable throughout the value chain, the end-user tariff must at least be at a cost-reflective level. However, the tariff as it now stands is significantly below what is necessary for the sector. As a result, not only is PHCN continuously unable to meet recurrent expenditure requirements, it must continually beg government for additional monies for short term and long term capital expenditure. Further, and more importantly, without a pricing regime that supports financial viability in the sector, it simply makes no sense for a private sector operator to come into the market.

To set this in context, Nigeria's regulated end-user tariff is far below the prices paid in most West African countries (as shown in the table below) and is even much lower than the prices paid in more efficient markets, where demand is fully satisfied and the costs to produce electricity are considerably less (e.g. the US and the UK).

| Triphase domestic usage |              |              | Commercial usage |              |              |
|-------------------------|--------------|--------------|------------------|--------------|--------------|
| Country                 | US cents/kWh | N/kWh        | Country          | US cents/kWh | N/kWh        |
| LIBERIA                 | 34.00        | 51.00        | LIBERIA          | 34.00        | 51.00        |
| MALI                    | 29.57        | 44.36        | MALI             | 30.57        | 45.86        |
| BURKINA FASO            | 25.48        | 38.22        | BURKINA FASO     | 25.30        | 37.95        |
| SENEGAL                 | 17.74        | 26.61        | SENEGAL          | 24.91        | 37.37        |
| GAMBIA                  | 16.68        | 25.02        | GAMBIA           | 24.17        | 36.26        |
| COTE D'IVOIRE           | 16.51        | 24.77        | COTE D'IVOIRE    | 19.10        | 28.65        |
| <b>MEDIAN</b>           | <b>16.43</b> | <b>24.64</b> | <b>MEDIAN</b>    | <b>18.73</b> | <b>28.10</b> |
| BENIN                   | 16.34        | 24.51        | TOGO             | 18.36        | 27.54        |
| TOGO                    | 15.55        | 23.33        | BENIN            | 16.00        | 24.00        |
| NIGER                   | 11.23        | 16.85        | GHANA            | 14.61        | 21.92        |
| GHANA                   | 10.32        | 15.48        | NIGER            | 13.54        | 20.31        |
| GUINEA                  | 8.70         | 13.05        | GUINEA           | 12.40        | 18.60        |

Source: "Comparative study of electricity tariffs used in Africa – December 2009", conducted by the General Secretariat of UPDEA (Union of Producers, Transporters and Distributors of Electric Power in Africa)

As noted earlier, the average unsubsidised tariff in Nigeria in 2009 was 7 Naira per kWh and the government was required to pay an additional average subsidy of less than 4 Naira per kWh. However, analysis conducted by the Presidential Task Force on Power indicates that even on the most optimistic of assumptions, the true "cost-reflective" average end-user tariff, for at least the next four years, is not less than 22 Naira per kWh, i.e. the average of tariffs set for all the different classes of customers across the three customer categories (residential, commercial and industrial).

**The Federal Government is mindful of these figures and it recognises that the cost of setting prices too low is several orders of magnitude higher than the cost of setting them too high.**

## 2.2 The establishment of a bulk purchaser

As shown in the table below, there are four basic ways to structure a grid-based electricity market (although there are many possible variations on each).

|                              | Model 1                        | Model 2                   | Model 3                                                                                | Model 4                                                  |
|------------------------------|--------------------------------|---------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------|
| <b>Characteristic</b>        | Vertically Integrated Monopoly | Principal Buyer           | Multiple Buyer                                                                         | Full Retail Competition                                  |
| <b>Definition</b>            | Monopoly at all levels         | Competition in generation | Competition in generation (with imbalances settled at a contract or spot market rates) | Competition in generation and choice for final consumers |
| <b>Competing Generators?</b> | NO                             | YES                       | YES                                                                                    | YES                                                      |
| <b>Choice for Discos?</b>    | NO                             | NO                        | YES                                                                                    | YES                                                      |
| <b>Choice for consumers?</b> | NO                             | NO                        | NO                                                                                     | YES                                                      |

In most developing countries which have attempted to commercialise their State owned electricity industries, the natural expectation is that the industry will transition to a principal buyer model (Model 2) until such time as the industry has developed the settlement, accounting, managerial and governance systems required for the more sophisticated multiple buyer model (Model 3).

This trajectory was clearly envisaged and articulated in the Electric Power Sector Reform Act (EPSRA) of 2005. The EPSRA makes clear that, during the Transition Stage, a special trading entity will carry out bulk purchase of electricity and ancillary services and resell these to licensed distribution companies. This is on the understanding that all contracts entered into by this bulk buyer would be capable of being novated to the successor distribution companies when the latter attain commercial viability.

“immediately following the issuance of the interim licenses to the successor companies.....and prior to the declaration by the Minister.....that a more competitive market is to be initiated....**the trading licensee holding a bulk purchase and resale license**.....and to which the function of bulk purchase and resale of power and ancillary services has been transferred....**shall engage in the purchase and resale of electrical power** and ancillary services **from independent power producers** and from the successor generating companies...” (EPSR Act section 25a).

To this end, a new entity called Nigerian Bulk Electricity Trading Plc (NBET) was incorporated on 29th July 2010 with the specific purpose of carrying out, under license from NERC, the bulk purchase and resale function expected by the EPSRA. This entity is now being appropriately resourced with financial and human resources; a payment (or credit) support package is now being set up; and, simultaneously, the first set of power purchase agreements (PPAs) with existing IPPs to take up their current stranded generation capacities are already been negotiated. As soon as these PPAs are negotiated and signed off, the bulk

trader will proceed to procure further PPAs not just from successor generating companies and existing IPPs but also from potential new entrants into the power generating market.

It should be noted that the bulk trader, by policy and statute, is required to be a transitional entity that will last only for as long as it takes the distribution companies in a private sector-driven market to establish their individual credit-worthiness. In addition, the Bulk Trader's obligations under the PPA will be supported by a payment support package that ensures that any liability contingent upon default by a distribution company will be immediately made good. The establishment of the bulk trader and backing it with a credible payment support package, taken together with a MYTO that allows the full pass-through of allowable costs, therefore removes the single biggest risk element – lack of credit-worthiness at distribution level – that has militated against the growth of the market.

It is also important to note that the establishment of the bulk trader will not impose a “single buyer” model upon the industry because the distribution companies, to the extent that they are able to, will be allowed to procure power bilaterally alongside the bulk trader

### 2.3 The provision of FGN credit enhancement

The preceding discussion makes it clear that although the establishment of a bulk purchaser is a *necessary* precondition for large-scale private sector investment in new power generating capacity, it is not a *sufficient* condition. For even if an IPP succeeds in signing a PPA on commercial terms with the bulk purchaser, this PPA (in the short to medium term) is unlikely to be bankable if the bulk purchaser is not credit-worthy.

In the absence of this credit-worthy procurer of power, *all* of the following conditions would have to be met before an IPP may be in a position to secure the funding required to commence investment.

|                                                                                                                                                                                                                                                                                                 | Likely Timeline   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| <b>1. A significant tariff increase</b><br>Without which the bulk purchaser would be unable to honour its payment obligations.                                                                                                                                                                  | 2010 – early 2011 |
| <b>2. The successful privatisation of the distribution companies</b><br>Without which the technical and non-technical losses currently incurred by the distribution companies would preclude the bulk purchaser from honouring its payment obligations even with a significant tariff increase. | 2011 – mid 2012   |
| <b>3. The successful commercialisation of the Transmission Company of Nigeria</b><br>In the absence of which the ability of the bulk purchaser to honour its payment obligations would be put at risk by the impact of mid-stream transmission constraints on down-stream revenue collection.   | 2011 – early 2012 |

Given the timelines outlined above, there are at least two options available to the Federal Government and to prospective IPP developers.

#### Option 1: Wait (three or four years) before making large-scale IPP investments

The first option is simply to **wait** until the conditions outlined above have come into effect and the bulk purchaser and/or the individual distribution companies have become commercially viable and credit-worthy.

This option is likely to delay the urgently needed private sector investment in power generation by at least four years with new generation coming on stream 2 to 3 years later.

The cumulative cost of this option – in terms of the GDP growth that would be lost as a result of this delay – would (on conservative estimates) be at least USD\$200 billion (cf. Appendix A).

#### Option 2: Provide FGN credit enhancement to facilitate immediate investments by IPPs

The second option is to support the more immediate investment by IPP developers in power generation by ensuring that the bulk purchaser is credit-worthy. To do this, the Federal Government will look to provide some form of credit enhancement to the bulk purchaser along with the instalment of an appropriate payment mechanism to ensure the liquidity of such credit support arrangement. Legal and financial advisers are currently being retained to aid the Federal Government in considering the variety of mechanisms that may be used to provide such credit enhancement. Some potential options are:

- a. An FGN-backed Letter of Credit (LC), to provide liquidity to the bulk purchaser;
- b. A Rolling Guarantee of the obligations of the bulk purchaser, issued by a multilateral institution or domestic and/or international banks, with a counter-guarantee issued by the FGN;
- c. A World Bank Partial Risk Guarantee backed by a FGN indemnity;
- d. An FGN treasury bond issue; or
- e. A combination of two or more of these options.

Whatever form of credit support enhancement is decided upon, it must be understood that it will only create a *contingent* liability, which in turn will only become an *actual* liability for the Federal Government if:

- a) The power plant is actually financed and built by the IPP developer;
- b) The power plant's generating units are actually working and available;
- c) The power plant has secured itself the requisite feedstock; and
- d) A distribution company, and in turn, the bulk purchaser are unable to honour a portion of their payment obligations to the relevant IPP.

Given that it will take a minimum of 12 months to 3 years from the execution of a PPA before new contracted capacities are available for dispatch through the grid, this provides the Federal Government with ample time to implement its reform agenda; and in particular to undertake the privatisation of the electricity distribution companies. In turn, this privatisation process, especially considering the requirement that core investors commit to specific investments aimed at reducing aggregate commercial and technical losses, will reduce the likelihood that an IPP will ever need to call upon any government guarantee.

Moreover, the very fact that the Federal Government is willing to support the bulk purchaser entering into the PPAs should aid the *acceleration* of these reforms – which in turn will rapidly decrease the value of any potential liability.

### The preferred option

The principal risk of providing the FGN credit enhancement required to kickstart investments by the IPP developers is that the distribution companies do not have the immediate capacity to pay for all the power that is being procured on their behalf by bulk purchaser and the Federal Government is then obligated to step in.

However, the Federal Government recognises that the maximum cost to the country posed by this risk is likely to be a small fraction of the much larger cost to the country (in terms of lost GDP) of the alternative policy option, namely failing to provide the necessary FGN credit enhancement and delaying the financing of large-scale investment in IPPs by several years.

Therefore it is necessary to ensure that the right form of credit enhancement is provided to the bulk purchaser to make it credit-worthy and to avoid a much larger cost to Nigeria in terms of GDP.

## **2.4 Creating an efficient and motivated workforce**

The attempted commercialisation of the successor companies (through divestiture, management contracts or concessions) has, hitherto, been frustrated by the operational and financial risks to potential acquirers of successor companies posed by the government's failure to reach an agreement with the labour unions on the settlement of outstanding arrears (of salaries, pensions and other benefits) and on severance pay.

These risks were succinctly captured by the National Council on Privatisation in its July 2009 "Update on the Electric Power Sector Reform and Privatisation", wherein it was noted that:

*"There is no doubt that labour is a major obstacle to the successful implementation of the electricity sector reform. Labour union officials have made it clear that they will not willingly cooperate with government in reforming the electric power sector. On several occasions they have prevented investors and consultants from having physical access to power plants, offices, equipments etc. If the electric power sector reform*

*programme is to be successfully implemented, the government must take urgent steps to resolve labour issues.”*

In an effort to resolve these concerns, the Federal Government has engaged in active dialogue and engagement with the leaders of the labour unions. The Presidency, throughout these discussions, has stressed that:

- investors in the power sector need experienced workers in various aspects of the business and that it makes business sense to re-absorb existing workers who know the job and understand the territory;
- the intention in resolving labour issues is not to promote job loss but rather to improve the sector as well as the labour workforce; and
- faithful implementation of the reforms will result in a much larger, more dynamic sector with industry players enjoying significant profits, consumers enjoying better service delivery and, most importantly, workers enjoying better conditions of service. In this environment, we will certainly see a net gain in employment and we all stand to benefit.

Since its establishment, the Labour Technical Committee of the Presidential Action Committee on Power has been successful in building the confidence of the Labour Unions leadership in the Government’s commitment to resolve all outstanding labour issues. During this period, the Labour Technical Committee has reviewed all past agreements between Labour and the government and has shown commitment in words and action to resolve all outstanding issues. The Labour Unions – National Union of Electricity Employees (NUEE) and the Senior Staff Association of Electricity and Allied Companies (SSAEAC) – have reciprocated. The noticeable improvement in power availability we currently experience must be credited to the renewed commitment of the sector workers. We commend them.

Moving forward, the Government has decided to fast track the resolution of all issues where there is agreement between all parties and isolate areas of dissent for later discussion. To make sure that Government can respond faster to her commitments, a total sum of N200 billion has been appropriated in the 2010 budget for the sector labour issues. Out of this budgeted amount, N57.6 billion has been made available to pay arrears of monetisation benefits due since 2003. This amount has been made available to PHCN for the settlement of the arrears.

The payment of these arrears of monetisation benefits is an important indication from the Federal Government of its commitment to resolve all outstanding labour issues and its recognition that this resolution is integral to the successful reform of the sector.

The next step in the Labour Resolution Strategy is to brief the Labour Unions on the activities of the Presidential Task Force on Power (PTFP), the Power Reform Roadmap and the critical role of the Labour Unions in the process.

Resolution of the outstanding labour issues will require a change in the mindset of all parties from a negotiations perspective to a problem solving partnership. The Labour Technical Committee understands that all parties involved in these discussions are committed to an effective resolution of the issues. As a result, a Joint Problem Solving Team (JPST) will be created, as a partnership between government, Labour and credible third parties to resolve all the outstanding issues.

The JPST will set the agenda, principles, and mechanisms for solving all the outstanding labour issues and will develop and manage the consultation agenda and discussion schedules.

The Labour Technical Committee, in its efforts to develop an agreed Issues Register, requested the Labour Unions to submit Position Papers on the labour issues that are to be resolved. In addition, the Committee also requested government agencies involved in the sector to submit Position Papers on their understanding of government's position on the issues. Position Papers were received from the Labour Unions (NUEE and SSAEAC), Ministry of Power, Ministry of Labour, and Bureau of Public Enterprises (BPE). Based on the submissions, JPST will draw up a stakeholder map for resolving the issues identified in the Position Papers.

There are a number of issues that are yet to be agreed between the Labour Unions and the government. However, the expectation is that by the end of the year a comprehensive agreement on all outstanding issues will have been negotiated with the labour unions.

## **2.5 Operationalising NELMCO**

The Nigerian Electricity Liability Management Company (NELMCO) was established as a government Special Purpose Vehicle (SPV) on the understanding that it would assume and manage extant assets, liabilities and other obligations that could not be easily transferred from PHCN to any of the Successor Companies.

However, although the legal entity was duly incorporated, the institution has yet to be properly resourced and operationalised. There is a danger that a delay in operationalising NELMCO could act as a drag on private investment in the sector, in so far as it leaves potential acquirers of successor companies with an unwelcome degree of uncertainty as to the size of the legacy PHCN liabilities which they might eventually find themselves landed with.

In light of these concerns, the Federal Government is working to ensure that NELMCO is made fully operational without further delay and that any uncertainties with regard to the transfer of residual liabilities are removed. In the process thereof, the Federal Government will also make clear to investors the complementary roles to be played (in the management of legacy liabilities) of both NELMCO and the Bulk Purchaser. The envisioned roles, respectively, are that NELMCO inherits all of the legacy PHCN liabilities, as well as any liabilities associated with the existing PPA agreements, and the Bulk Trader assumes ownership of the existing PPAs and executes new buy and sell agreements with the successor generation/distribution companies and IPPs.

With regard to timelessness, the Government expects the full operationalisation of NELMCO to take place as soon as NERC and BPE have completed their due diligence on the PHCN successor companies and the Government is able to assess the precise extent and nature of the liabilities to be transferred to NELMCO.

## **2.6 Contracting out the management of the Transmission Company of Nigeria**

The management of the Transmission Company of Nigeria (TCN) is a key concern for potential investors in the power generation and power distribution sectors. These investors will be reluctant to make large-scale investments in the upstream and downstream sectors of the electricity industry unless they are confident that commensurate investments in the midstream sector will also take place.

In light of these facts, it is essential that the management of TCN be contracted out to a private company which has both the requisite project management expertise and technical expertise.

To that end, the BPE tendered a management contract for TCN, which resulted in a shortlist of four interested bidders and bid (technical and financial) submissions by three of the bidders. However, this contract was never concluded. And, given the time that has subsequently elapsed, the National Council on Privatisation (NCP) have now recommended that a new call for expressions of interest be issued to all of the preferred bidders from the previous exercise.

Accordingly, the Bureau of Public Enterprises (BPE) has now initiated the process necessary to re-engage the advisers for the completion of the management contract process. Upon completion of this process, it is expected that the adviser will re-start the procurement exercise for the management contract consistent with the NCP's recommendation (by extending invitations to the three original bid submitters to resubmit their offers and evaluating these offers prior to the ultimate award of the contract). The process is expected to be completed by February 2011.

## **2.7 Clarifying and strengthening the licensing regime**

The EPSR Act provides for licenses that shall not exceed ten years duration although NERC may extend, on a rolling basis, the validity of the licenses for additional five year periods. But electricity asset investments involve high fixed costs with a long duration and investors expect the life of the licence to be more or less in line with the period required to recover their investments. In most cases, this period is between 20 and 25 years not 10 to 15 years.

The Presidential Task Force on Power has, therefore, been working with NERC to develop a comfort mechanism for investors that will assure them of renewal/extensions of their license provided they meet the necessary conditions. This comfort mechanism will involve the issuance of regulations by NERC setting out the process by which an extension will be considered and given, who can initiate the process and when, the criteria that will be applied, the requirements to be met and timetables for decision-making, and the process of

appeals by the licence holders against decisions made by NERC. Accordingly, NERC is currently reviewing various regulatory options, as necessary to address the issues addressed above.

## **2.8 Ending the trend of inconsistent policy implementation**

The reform of the policy and statutory foundations of the NESI started in early 2000 when a formal gathering of stakeholders started the work of a full-scale review of the sector. The result of this review process was the drafting of a National Electric Power Policy approved by the Federal Executive Council in 2000 and published in March 2001; and an Electric Power Sector Reform Bill that was approved also by the Federal Executive Council and presented by the President to the National Assembly in September 2000 for legislative action.

After further intensive stakeholder review, the Bill was passed by the National Assembly in Q2 2003 but could not be assented to by the President before the end of that legislative session on 29<sup>th</sup> May 2003. Accordingly, the Bill had to go through the full legislative process all over again and was not passed and assented to until March 2005. The first formal steps of reform under the Act started with the commencement of the termination of NEPA, creating PHCN, unbundling it and then constituting NERC with the first set of Commissioners and subsequently having NERC issue the first licenses in the industry to the PHCN successor companies.

Unfortunately, progress through the various stages of development anticipated by the 2001 Electric Power Policy has been substantially delayed. Meanwhile the policy imperatives have become all the more acute. This Administration recognises: firstly, that the status quo is absolutely unacceptable; secondly that the foundation of sustainable sector reform rests on the establishment of commercial viability and regulatory certainty across the entire electricity value chain; and thirdly, that the confidence-sapping and morale-destroying gap between official rhetoric and market growth and development must be avoided and must be filled by firm and timely policy implementation.

It is in recognition of these imperatives that Mr. President has taken personal oversight over the implementation of the various reform actions mandated by the Electric Power Sector Reform Act, 2005. To this end, the Presidential Action Committee on Power (PACP) and its implementation arm, the Presidential Task Force on Power (PTFP) have been set up and have swiftly taken action to restart the sector reform process and restore confidence and regulatory certainty to the market. In addition, and most importantly, the leadership vacuum at NERC has been resolved and action is being taken to establish a credible leadership therein.

### **3.0 Clarifying the Government's strategy on the divestiture of the PHCN successor companies**

Whilst the government is committed to resolving each of the specific obstacles to private sector investment outlined above, it is also conscious that potential investors in the sector are looking for a clear indication of the government's overall strategy or "philosophy" in respect of the divestiture of the 18 successor companies.

With a view to meeting this demand, the following sections set out (in brief) the approach to the divestiture of each of the 18 successor companies adopted by the National Council on Privatisation (NCP) which is required by the Public Enterprises (Privatisation and Commercialisation) Act to design and supervise all privatisation transactions.

#### **3.1 Hydro power generating plants**

In regard to the hydro power generating plants, the strategy adopted by the BPE is to grant concessions for the operation of Kainji, Jebba and Shiroro. This approach is principally predicated on the magnitude of the capital requirements and water rights issues associated with these plants; but it also reflects the link between the sustainable management of hydro power and the development of the country's agricultural resources. The concession of the hydro plants is expected to be done through open tender managed by the BPE-engaged Transaction Advisers.

#### **3.2 Thermal generating plants**

The PHCN successor thermal generating plants will be privatised via a sale of a minimum of 51% equity to core investors that clearly demonstrate the technical and financial ability to operate and expand each plant. Care will be taken, by working closely with NERC, to ensure that a monopoly or oligopoly of market power in the generation sector is not acquired through these divestitures. Rather, unrestricted market entry of competent operators not only via privatisation but directly through licensing new IPPs; the competitive bulk procurement of electricity by the Bulk Trader; and the bilateral contracting of electricity between generating and distributing companies – all overseen by a fully-empowered independent sector regulator through the Multi Year Tariff Order (MYTO) mechanism – are the key guarantors that electricity will be generated into the grid on a competitive, commercial and consumer-oriented basis.

The NIPP plants will be managed under Operation and Maintenance (O & M) contracts now being prepared by the Niger Delta Power Holding Company (NDPHC), the parent company of these plants. The mode and strategy for their subsequent divestiture will then be communicated once these plants have been commissioned.

#### **3.3 The Transmission Company of Nigeria**

As already indicated earlier on in this chapter, the Government believes that the management of TCN should be handed over to a credible private sector company under a five year management contract. Unlike the power generation and power distribution

sectors, the national grid maintained by TCN is not one that can be readily opened up to competition. On the contrary it forms a natural monopoly and one, moreover, which is of critical importance to the country's national security.

The key, therefore, to the successful commercialisation of the national grid is the appointment of a management contractor with the skills required to manage the huge and complex programme of construction and rehabilitation that will be required over the coming decade.

Considering that the timely provision of long-term and cost-effective financing for grid stability and expansion is critical, the PACP has approved the establishment of a Transmission Network Development Fund. This Fund is now being established as an infrastructure fund (regulated by the Securities and Exchange Commission) that will gather long-term financing from the private and public sectors solely for the purpose of investing in TCN's high voltage transmission grid construction projects and will be repaid directly from the Transmission Use of System (TUOS) charges that are levied at economic rates by TCN for wheeling electricity between generators and distributors, eligible customers and other licensed end users.

### **3.4 The Distribution Companies**

As part of the larger reform effort of the electricity sector, the eleven distribution successor companies are expected to be privatised, based on a core investor sale of a minimum of fifty-one (51) percent of the government's equity in the companies. The Federal Government recognises that the commercial viability of the distribution sector, being the provider of an overwhelming proportion of industry revenues, is the foundation of market stability and growth.

Thus, the NCP has decided that the preferred distribution sale methodology is to be modelled along the lines of the approach that emphasizes the reduction of technical and commercial losses and increased efficiency of collections. This is the Aggregate Technical, Commercial and Collection (ATC&C) loss reduction model. Accordingly, in addition to their offers for ownership of a minimum of fifty-one (51) percent equity in the distribution companies, bidders are expected to submit investment proposals on their strategy for meeting the efficiency targets that will be specified in the Requests for Proposals to be put out by NCP during the sale process.

## **4.0 Reforming the fuel-to-power sector**

Although this chapter has focused on the reforms that need to be undertaken within the electricity industry per se (i.e. the power generation, transmission and distribution sectors); the Federal Government is also conscious of the need for complementary reforms in the upstream fuel-to-power sector.

Significant reforms of the gas industry have already taken place over the past 12 months and these reforms will have a direct and positive impact on the electricity industry in the years to come. Nevertheless, the Government is conscious of the need to put in place

additional incentives to attract the tens of billions of dollars of private sector capital which the industry will require over the coming decade.

A summary description of the policy actions which need to be taken to effect this change can be found in the Fuel-to-Power Chapter of this Roadmap.

## 5.0 The reform timetable

In addition to the “headline” tasks outlined in this chapter, there are a host of supplementary tasks that are now being or will be effected during the coming months in order to accelerate the reform process. These tasks include, amongst other things:

- The corporatisation of PHCN successor companies and the institution of proper business planning and performance contracts through which the successor companies will be held responsible and accountable;
- The finalisation and execution of vesting contracts between power generating companies and the distribution companies/Bulk Purchaser;
- Operationalising the Market Rules and the concomitant resourcing of the System and Market Operators;
- The establishment of eligibility parameters for the declaration of eligible customers by the Ministry of Power;
- The engagement of transaction advisers and the development of transaction options and successor company valuation reports;
- Critical pre-transaction documentation/corporate actions e.g. asset/staff transfer orders, board resolutions for the appointment of directors, employment contracts, technical boundary delineation orders, etc; and
- The complete wind-down and liquidation of PHCN.

The full list of tasks and milestone dates which is currently being monitored by the Presidential Task Force on Power is reproduced on the pages overleaf. It is important to note, however, that this list of tasks is restricted to the reforms which need to take place in the Electricity Industry per se and does not include the list of reforms which need to take place in the gas supply industry. These latter reforms are treated separately in the Fuel to Power Chapter of this Roadmap.

## Action Plan for Reform of the Nigerian Electricity Supply Industry: Key Tasks and Milestone Dates

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## Ch.2 – Improving Service Delivery Throughout the Transition

### 1.0 Introduction

As described in the preceding chapter, it is the Government's intention that the Nigerian Electricity Supply Industry should be principally owned and controlled by the private sector. However, this transition cannot happen overnight and, *for an interim period*, the Federal Government of Nigeria – through its parastatals – will continue to retain direct accountability for service delivery across large parts of the electricity value chain. In light of the above, consumers (and the electorate as a whole) have a right to know what level of service delivery is expected of these parastatals during the transition period.

As described below, in the very short term (i.e. in the period up to April 2011), the service delivery targets for which the government will bear direct managerial accountability encompass all four components of the value chain, viz. the fuel-to-power sector; power generation; transmission; and distribution.

In the subsequent medium term (i.e. in the period between April 2011 and December 2013), the Government will substantially reduce its funding and managerial direction of the sector as a whole. But it will retain a significant degree of accountability for service delivery standards in certain key areas (e.g. the transmission network and specific areas of power generation which the government may choose to underwrite in the interests of fuel diversity).

### 1.1 The Short Term Objective

The principal short-term objectives (in the period up to April 2011) are two-fold. In the first place, the government is aiming to ensure a substantial increase in the total quantum of power delivered to electricity consumers across the country.

The second and equally important objective is to ensure that the supply of power will not only be significantly greater than ever before but that it will also be much less *erratic and unpredictable*.

In this regard, it is important to note that in the short to medium term, the differential increases in generation, transmission and distribution capacity will enforce a substantial degree of spinning reserve that will allow the System Operator to maintain generation levels at a relatively steady level instead of being tempted into running all the available machines flat out.

More importantly, the Government will also be urging the System Operator and the various distribution companies to undertake more strategic and more predictable load-shedding practices. This policy reflects the Government's acknowledgement that a modest increase to a new, steady and predictable level of electricity distribution is of significantly greater value to electricity consumers than a higher (nominal) increase which ultimately proves to be highly erratic.

## 1.2 The Medium Term Objectives

As noted above, the medium term will witness a substantial reduction in the Government's funding and managerial direction of significant elements in the electricity value chain. Hence the medium term service delivery objectives which are described at various points in this Road Map are typically focused on those objectives for which the government expects to retain a significant degree of accountability.

In the sections that follow, these objectives are described by reference to each of the four components in the value chain. Nevertheless, it is possible to set an *overarching* medium term service delivery objective for which the government can be held directly accountable. Simply put, by December 2013, the total quantum of power delivered to electricity consumers across the country should be at least *twice the current level*<sup>3</sup>.

This overarching goal is an ambitious one, particularly in the light of the long history of broken promises which have accompanied previous "action plans" for the power sector. Nevertheless, the Federal Government recognises that a two fold increase in power distribution by December 2013 is the *least* that should be expected from the planned completion of projects *which have already been budgeted* and for which the government will retain direct accountability, namely:

- the completion of all the long overdue NIPP projects (for generation, transmission and distribution);
- the completion of the outstanding (and already budgeted) PHCN projects; and
- the completion of the outstanding (and already budgeted) NGC investments in the gas supply and transportation industry.

## 1.3 The Disclosure Objective

The Federal Government also believes that its service delivery responsibilities encompass more than the delivery of kilowatt hours. Electricity consumers (and the electorate as a whole) have a right to information as well as electricity. The Federal Government has set itself extremely stretching delivery targets and is working assiduously to meet those targets. It acknowledges, however, that in many areas, actual performance may fall short of targeted performance. When this has happened previously, the temptation has been to dissemble and/or to restrict the disclosure of the performance indicators by which progress could be accurately measured.

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<sup>3</sup> This figure takes into account the projected increases in the capacity of each component in the electricity supply chain. For example, although power generation capacity is projected to show a marked increase by December 2013, current projections suggest that this will not be matched by a commensurate increase in transmission and distribution capacity. In summary, the Government's current target for the total amount of power that can be delivered to end-users by the end of December 2013 is in the region of 8,000 MW (roughly twice current maximum levels).

By contrast, the Federal Government is determined that its progress against objectives should be made clear and transparent – irrespective of the extent to which actual achievements fall short of the targeted goals.

## **2.0 Fuel-to-Power**

Nigeria is blessed with numerous fuel sources for power, including hydro, natural gas, coal, wind, solar and an abundance of waste for biomass. However, because of the high capital costs required at this time to implement commercial power generation through solar, wind and biomass, the Federal Government is committing to focus on electricity generation in three areas, namely: Hydro, Coal and Natural Gas, of which the latter represents the largest resource for fuel-to-power. It is the intention of the Federal Government to exploit this asset to its fullest by converting flared gas assets and harnessing non-associated gas for power application.

However, this will require investment far beyond what the Federal Government can muster and will require providing appropriate incentives to investors such as the International Oil Companies (IOCs) and other investors in Oil and Gas businesses. A first step in this direction has been taken through the release of the National Gas Masterplan whose provisions will encourage private sector investment in gas infrastructure so that gas can be used throughout the nation for industrial processes and power generation. But, as described below, additional policy decisions should and will be made by the Government over the coming year to help stimulate the requisite levels of investment.

### **2.1 The short term match between fuel supply and power generation**

Most of the power plants to be built in the southern part of Nigeria over the next few years will be gas fired. And in the short term (the period up to April 2011), there will be enough gas supplied to power producers (circa 1,636 mmscfd) to support the targeted increase in actual generation capacity of circa 7,000 MW.

### **2.2 The medium and long term challenges**

As shown in Tables 1 and 2 below, by the end of 2011, the available generation capacity is projected to outstrip the available gas supply to power producers. From then on – unless there is a significant inflow of private sector investment into the industry – the gap will begin to increase such that by the year 2013 more than 3,000MW of generating capacity will not have gas to support it.

The only solution is to attract investment as quickly as possible into the gas sector by making it viable for the private sector to play a significant role in the industry. The Fuel-to-Power Chapter of this Roadmap contains details of where the gaps exist in the country's western and eastern axes of gas production and where this investment could be best targeted.

Thereafter, to meet the longer term Vision 20:2020 goal will require billions of dollars investment which the Federal Government cannot meet. There is therefore the need to

provide the basis for immediate private sector participation in this area. Consequently, the Federal Government will begin to engage the IOCs and smaller independent oil companies to fast track bankable gas supply agreements as well as gas transport to both Federal Government power plants and the independent power producers' plants.

**Table 1: Targeted Increases in capacity in each section of the electricity value chain between July 2010 and April 2011**

| Fuel-to-Power Availability |               |            |               |      | Available Generation Capacity |      |      |      |      | Transmission Capacity |      |      | Distribution Capacity |      |
|----------------------------|---------------|------------|---------------|------|-------------------------------|------|------|------|------|-----------------------|------|------|-----------------------|------|
| July 2010                  |               |            |               |      | July 2010                     |      |      |      |      | July 2010             |      |      | July 2010             |      |
| NGC/Direct                 | Total mm scfd | PP mm scfd | Other mm scfd | MWE  |                               | FGN  | NIPP | IPP  | All  |                       |      |      |                       |      |
| W.A.                       | 785           | 595        | 190           | 2142 | Hydro                         | 1230 | 0    | 0    | 1230 | KV                    | 330  | 132  | MVA                   | 7198 |
| E.A.                       | 52            | 24         | 27            | 86   | Thermal                       | 1862 | 0    | 1520 | 3382 | MVA                   | 6444 | 8346 | MW                    | 5758 |
| Direct                     | 212           | 212        | 0             | 1100 | Total                         | 3092 | 0    | 1520 | 4612 | MW                    | 5155 | 6677 |                       |      |
| Hydro                      | 0             | 0          | 0             | 1230 |                               |      |      |      |      |                       |      |      |                       |      |
| Total                      | 1049          | 831        | 217           | 4558 |                               |      |      |      |      |                       |      |      |                       |      |
| Dec 2010                   |               |            |               |      | Dec 2010                      |      |      |      |      | Dec 2010              |      |      | Dec 2010              |      |
| NGC/Direct                 | Total mm scfd | PP mm scfd | Other mm scfd | MWE  |                               | FGN  | NIPP | IPP  | All  |                       |      |      |                       |      |
| W.A.                       | 1085          | 825        | 260           | 2970 | Hydro                         | 1230 | 0    | 0    | 1230 | KV                    | 330  | 132  | MVA                   | 7917 |
| E.A.                       | 150           | 84         | 66            | 302  | Thermal                       | 2278 | 351  | 1520 | 4149 | MVA                   | 6894 | 9160 | MW                    | 6334 |
| Direct                     | 212           | 212        | 0             | 1100 | Total                         | 3508 | 351  | 1520 | 5379 | MW                    | 5515 | 7328 |                       |      |
| Hydro                      | 0             | 0          | 0             | 1255 |                               |      |      |      |      |                       |      |      |                       |      |
| Total                      | 1447          | 1121       | 326           | 5627 |                               |      |      |      |      |                       |      |      |                       |      |
| April 2011                 |               |            |               |      | April 2011                    |      |      |      |      | April 2011            |      |      | April 2011            |      |
| NGC/Direct                 | Total mm scfd | PP mm scfd | Other mm scfd | MWE  |                               | FGN  | NIPP | IPP  | All  |                       |      |      |                       |      |
| W.A.                       | 1085          | 825        | 260           | 2970 | Hydro                         | 1380 | 0    | 0    | 1380 | KV                    | 330  | 132  | MVA                   | 8625 |
| E.A.                       | 275           | 209        | 66            | 752  | Thermal                       | 2867 | 1266 | 1520 | 5653 | MVA                   | 7494 | 9160 | MW                    | 6900 |
| Direct                     | 602           | 602        | 0             | 2504 | Total                         | 4247 | 1266 | 1520 | 7033 | MW                    | 5995 | 7328 |                       |      |
| Hydro                      | 0             | 0          | 0             | 1485 |                               |      |      |      |      |                       |      |      |                       |      |
| Total                      | 1962          | 1636       | 326           | 7711 |                               |      |      |      |      |                       |      |      |                       |      |

Note: As at July 2010, 831 mmscfd was available to power plants but only 687 mmscfd was actually used.

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### 3.0 Generation

As noted above, Nigeria will largely rely on hydro, coal and natural gas for generation of much of its power over the next decade. The sections below briefly set out the service delivery objectives (in both the short term and medium term) in respect of these three power generation technologies. The longer and more extensive Generation Chapter of this Roadmap provides additional detail in respect of the government's policy on renewables.

#### 3.1 The short term targets

In the short term (the period up to April 2011), the Government has set itself the twin objectives of rehabilitating circa 1,000 MW of generating capacity at existing PHCN power stations and adding an additional 1,266 MW of generating capacity from new NIPP power stations. The Generation Chapter of this Roadmap lists the individual projects which will contribute to this sum total.

It is also important to note that the strategy from the beginning of next year will be to maintain for every part of the country, the current allocation of power, and then begin to allocate a significant portion of the *additional* power that will come from the NIPP and other IPP projects to key industrial cities in the country. The intention is to immediately stimulate employment and economic growth across the nation.

A second strategy is to domicile as much power as possible from independent power producers (IPPs) in their local domain where the power is produced. For example if a power company is producing 100MW in Lagos and the evacuation infrastructure allows for the power to go straight into the local grid, the policy directive will be to connect the 100MW to the local distribution grid, thereby allowing a commensurate quantum of power from the national grid to flow to other parts of the country.

#### 3.2 The medium term targets

The medium term (December 2013) generation targets reflect the following policy objectives:

- the urgent need to complete all of the NIPP projects by December 2013;
- the withdrawal of the Federal Government from any further direct investment in or direction of thermal plants (whether gas fired or coal fired); and
- the incentivisation of private sector investment in the power generation sector.

Hence the Government expects the total power generation capacity of the existing PHCN power stations to increase between April 2011 and December 2013 by just 400 MW (to a total of just 4,642 MW). By contrast, the total power generation capacity of the NIPP plants is targeted to increase from 1,266 MW in April 2011 to 4,775 MW by December 2013. And the total power generation capacity from IPPs is targeted to increase from its current level of circa 1,500 MW to nearly 5,000 MW by December 2013.

Thus, in total, as shown in the matrices displayed in Tables 1 and 2 above, the government's medium term expectation is that just over 14,000 MW of power generation capacity will be available by December 2013.

To underscore the urgency with which the NIPP projects need to be completed, the Vice President has taken personal responsibility for addressing the issues that had constituted road blocks to the completion of these projects. He holds regular meetings with the contractors to better understand their issues and he pulls together the relevant parties involved so that problems can be speedily resolved.

However, given that a large component of the total expected increase in power generation capacity (by December 2013) is expected to come from IPPs, it is important to explain the strategy by which the Government expects to trigger the requisite increase in private sector investment.

The Federal Government is currently engaging companies that have installed capacities, either for manufacturing or as IPPs (including the international oil companies), to encourage them to expand their power production capacities and sell electricity to the national grid. Of particular importance are companies that not only have power generation capacities installed within their facilities, but also possess the requisite gas supply and power evacuation infrastructures. Given the right commercial incentives, these companies can be persuaded to use their capacity to provide additional power to the grid within a very short space of time.

The Government has also had discussions with a second category of IPP, namely those who possess a generation licence but have been unable to make significant progress in the development of their projects through the inability of PHCN to sign bankable PPAs. The Government is doing all that is necessary to prepare those who are ready in this category to sign PPAs before the end of this year.

Finally, the Government is also talking to IPPs with strong track records and credible development plans who have yet to secure a licence but who expect to do so before the end of the year.

In order to purchase power from these entities, the Federal Government – in line with EPSR Act 2005 – is in the process of setting up a bulk purchaser to purchase power and sell to the Distribution companies. This bulk purchaser will be provided with credit enhancement through the Ministry of Finance. This government entity has already been incorporated by BPE as the Nigerian Bulk Electricity Trading Plc (NBET). NBET will be licensed by the electricity sector regulator, NERC and will be the one to sign the PPAs with the private sector generation companies. The Federal Government expects that the draft power purchase agreements (PPAs) prepared by NERC will be reviewed and ready for signing within a month.

In each case, the Federal Government will not provide any upfront funding for these generation projects. The Government's assistance will be limited to the provision of credit enhancement to NBET to enable it to sign power purchase agreements, the payments under

which will only commence at such point as an IPP has actually been financed and constructed and the generating units are actually working, available, and adequately supplied with the requisite feedstock.

It is also important to emphasise that NBET will play this “middle man” role *only for an interim period*, until such time as the distribution companies become credit worthy and subsequently buy electricity directly from the power producers on a bilateral basis. This could be for a period of five years or however long it will take the last distribution company to achieve credit-worthy status.

### 3.3 The longer term targets

Although the Government is determined that the vast majority of all new power plants should be financed and built by the private sector, it also acknowledges that there is a case for some limited involvement by the FGN in the financing of renewable forms of power generation e.g. hydro (or other renewables) and in stimulating production of power from coal. However, it also acknowledges that the support for such power generation technologies should, where possible, be in the form of differential wholesale tariffs rather than direct capital injections by the FGN.

Notwithstanding the policy objective described above, the Federal Government is completing pre-existing plans that will lead to commencement of construction of the Mambilla Power plant which by itself will have an installed capacity of 2,600MW. Similarly, plans for Zungeru, with a capacity of 700MW are in process and the Government is examining plans to expand the Gurara Hydro power plant (which currently has 30MW installed) to a capacity of 300 MW. These projects could take up to 6 years to complete.

## 4.0 Transmission

### 4.1 The short term targets

As at July 2010, the transmission network was capable of evacuating and transmitting just over 5,000 MW of power. This was sufficient to ensure the evacuation of all the available power generation capacity.

By April 2011, the actual available power generation capacity is targeted to reach circa 7,000 MW. However, the *annual average generation* is always lower than the *actual generation capacity* (because the water flow at the hydro plants limits the available annual average to 950 MW; whilst at the thermal plants, the impact of temporary equipment failures and the need for routine maintenance means that the capacity factor – even for brand new plants – will rarely exceed 85%).

Thus, although the total actual generating capacity is targeted to increase from 4,612 MW to 7,033 MW by April 2011, the more meaningful set of figures (from a transmission planning perspective) is the fact that the increase in the annual average generation is targeted to increase from 3,825 MW in July 2010 to circa 5,755 MW in April 2011.

To ensure that this increase in generating capacity is not left stranded for lack of evacuation capacity, there would be a need for a 30% increase in the “true deliverable” transformation capacity of the country’s 330kV network between July 2010 and April 2011 above its current limit of circa 4,500 MW equivalent.

In practice, however, it is highly unlikely that an increase of this magnitude will be realisable by April 2011. On the contrary, the Government’s projected targets for April 2011 are that the “true deliverable” transformation capacity will rise by just over 10% to about 5,000 MW equivalent (even though the total nominal 330kV transformation capacity is projected to rise to 5,995 MW equivalent).

**Note on the calculation of transformation capacity:**

As shown in Tables 1 and 2 above, the total transformation capacity of the 330kV network was 5,155 MW equivalent in July 2010. However, given the imbalance between the distribution of transformers around the country and the distribution of required customer loads, it is inevitable that some transformers will be fully loaded whilst other are lightly loaded.

Moreover the nominal transformer capacity includes transformers that are on long term outage for various reasons that include the requirement for major repair or complete replacement because they have been inappropriately configured.

Hence, the numerical sum of transformer capacities indicated in Tables 1 and 2 actually represents a higher figure than the “true deliverable” transformation capacity, which was circa 4,500 MW equivalent as at July 2010.

## 4.2 The medium to long term targets

As noted above, even in the short term (i.e. by April 2011) the current projection is that the generation capacity will outstrip the available transformation capacity. Moreover, even with the completion of the extant (and already budgeted) PHCN and NIPP transmission projects, the gap between generation capacity and the capacity of the grid is expected to widen considerably over the coming three years.

For example, as shown in Tables 1 and 2 above, actual generation capacity by December 2011 is targeted to reach 9,767 MW which translates into an available annual average generating capacity of just over 7,900 MW. By contrast, the total nominal transformation capacity of the country’s 330kV network is not expected to exceed circa 6,500 MW equivalent by December 2011.

Moreover, although the total nominal transformation capacity is projected to increase to 8,653 MW equivalent<sup>4</sup> by December 2013, the gap between generation capacity and transmission capacity will have grown still further during the intervening two years. This is because the fruits of the urgently needed *new* investments in the transmission network will lag the medium term increase in power generation capacity by at least one or two years.

It is all the more imperative, therefore, that these new investments are pushed forward as rapidly as possible. To that end, the Federal Government plans to build a new super transmission network which will enable the grid to wheel power up to the requirements that will meet Nigeria's power needs for Vision 20:2020. Amongst other things, this supergrid will help to evacuate power from the proposed Mambilla hydro power plant. The procurement of designers for this network will shortly commence.

Alongside the work on the supergrid, the management contractor will also be responsible for significant investments in the reliability and stability of the network infrastructure, through the provision of grid integrity and reliability systems; and power quality and stability systems. These undertakings will further give impetus to the decision to domicile as much power as possible to local grids where the power is produced.

It is also important to note that a degree of private sector discipline will apply to both the management and the financing of these projects. More particularly, given the Government's commitment to the introduction of a genuinely cost-reflective tariff, a substantial portion of the requisite capital investments will be recovered through the revenues generated by the electricity market itself i.e. by the transmission use of system charges paid to the Transmission Company of Nigerian (TCN).

## 5.0 Distribution

As noted in Chapter 1 of this Roadmap, Government has decided to follow through on the EPSR Act 2005 and privatise all the distribution companies in order to induce efficiency and professional management in a sector that has, hitherto, been an easy source of leakage. At the end of the day, the financial viability and operational effectiveness of the entire supply chain rests upon the revenues collected by the distribution companies. And it is the Government's opinion that the fastest way to restore the industry to financial and operational health is to subject each of the 11 distribution companies to the full discipline of the private sector.

It is important to state, however, that in the post-privatisation period (when the private sector has assumed responsibility for the expansion and improvement of the distribution systems in Nigeria), the Nigerian Electricity Regulatory Commission will provide strict oversight of the distribution companies. In addition, the privatisation strategy which has been developed by the Bureau of Public Enterprises envisages that both the Federal Government and State Governments will be allowed to maintain small, minority, equity positions in some of the newly privatised companies until such time as these companies are

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<sup>4</sup> This increase will take place largely as a consequence of the completion of outstanding PHCN and NIPP projects.

stable and the various Governments can divest themselves by selling their shares to the Nigerian public.

However, the Government recognises that electricity customers are keen to see immediate improvements in service delivery and will not be satisfied with the mere promise that these improvements will materialise “after privatisation”.

To that end, in the run-up to the privatisation of the distribution companies, the Federal Government will be working hard to enhance the operational and commercial performance of the distribution companies. Not only will these efforts improve the quality of service experienced by electricity customers, they will also enhance the value of the distribution companies and the prices which the government is able to realise upon their divestiture.

### **5.1 The short term operational targets**

Over the past two months, the Presidential Task Force on Power has been working with the staff of the various distribution companies to determine (within a 10% margin of error) the capabilities of the various segments of the distribution network. This deceptively modest-seeming exercise (which is nonetheless unprecedented in the history of the Nigerian Electricity Supply Industry) has allowed the Government to focus its project planning and budgeting on those activities which are likely to generate the greatest short-term (i.e. pre-privatisation) improvements in service delivery.

As indicated in Table 2, the results of this analysis indicate that the total peak load on the entire distribution network is just over 9,057 MW, while the current total capability is 5,758 MW, giving a total distribution gap of more than 3,000 MW.

Faced with the gaps outlined in Table 2 above, the Government’s short term targets are as follows:

- To close circa 30% of the identified gaps by April 2011. This will increase total distribution capability from 5,758 MW equivalent to circa 6,900 MW equivalent. However, it is important to note that despite this increase in capacity, the total amount of electricity delivered to customers cannot exceed the “true deliverable” transformation capacity of the transmission network, which (as described in the previous section) is unlikely to exceed 5,000 MW equivalent by April 2011.
- To reduce aggregate distribution losses (technical and non-technical) by at least 5% by April 2011;
- To secure a noticeable increase in the average number of hours of electricity supplied to consumers by at least 10% by April 2011.

To a large extent, the achievement of these targets will be made possible through the completion of the on-going NIPP and PHCN projects, the budgets for which have already been provided. Nevertheless, there are a number of new projects which need to be funded

in order to secure the delivery of the Government's short term targets and these are currently being identified by the Presidential Task Force on Power.

## **5.2 The short term commercial targets**

At present, the average monthly revenue collection capability of the Nigerian Electricity Market is Ten Billion Naira (N10bn), while the average basic monthly obligation of the Market is Fifteen Billion Naira (N15bn). This leaves a monthly revenue gap of Five Billion Naira (N5bn).

This revenue gap arises due to low collection efficiency of the Discos and the non-payment of the MYTO subsidies. In the short term (i.e. the period up to April 2011), the Government aims to increase the monthly revenue collection of the industry to about N17.6bn which is slightly higher than the current basic obligations of the industry.

It should be noted however, that as generation improves, monthly obligations increase correspondingly. Nevertheless, appreciable reductions in the revenue gap can be obtained through reductions in technical and non-technical losses, the introduction of better customer care service programmes, and improvements in collection efficiency. With regard to the latter, the Government's target is to increase the total collection efficiency of the industry by at least 5% by April 2011.

## **5.3 Performance incentives for the distribution companies in the run-up to privatisation**

The Presidential Action Committee on Power is determined that the performance targets (both operational and commercial) are reached within the time periods outlined above. To that end, the Presidential Task Force on Power has developed an incentive scheme for the staff of the distribution companies which will offer rewards for good performance and sanctions for poor performance.

The key performance indicators for this scheme, include:

- Naira yield of energy delivered;
- Percentage growth in customer population;
- Percentage growth in customer response to bills;
- Percentage growth in customer metering;
- Percentage reduction in the number and frequency of transformer loss in circuit; and
- Percentage reduction in outstanding debt, and debt growth rate.

Performance will be measured and evaluated monthly and reports will be presented to the Presidential Task Force (on a monthly basis) with recommendations for rewards and sanctions.

#### **5.4 Medium to long term challenges**

Although the Government intends that full responsibility for the operational effectiveness of the distribution companies should shift in 2011 from the Federal Government to the private sector, the actions and decisions of the Federal Government will continue to exert a significant impact on their commercial effectiveness. More specifically, the Government acknowledges that its policy decisions on electricity tariffs will have a direct and critical effect on the financial viability of the privatised distribution companies.

To that end, as described in Chapter 1 of this Roadmap, the Government is committed to the introduction of a genuinely cost-reflective tariff which will secure the financial viability not just of the distribution companies but of the sector as a whole.

## Ch.3 – Fuel to Power

### 1.0 Short Term Supply of Gas on the Western Axis

#### 1.1 For the moment, power plants on the ELPS pipeline are not gas constrained

As at July 2010, none of the currently available power plants on the Escravos Lagos Pipeline System (ELPS) were gas constrained. This marks a significant improvement on the situation that prevailed earlier this year. The lifting of this constraint was partly a result of the completion of repairs of the vandalised ELP A gas pipeline and the Trans-Forcados liquid evacuation line. However, it also reflects a 38% increase in gas production on the Western axis from 520 million scfd in Quarter 1 of 2010 to 720 million scfd in the second quarter.

| GAS DELIVERY TO ELPS FOR POWER AND INDUSTRIAL CONSUMERS |                         |            |            |            |             |             |             |             |             |
|---------------------------------------------------------|-------------------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
|                                                         |                         | Q1, 2010   | Q2, 2010   | Q3, 2010   | Q4, 2010    | Q1, 2011    | Q2, 2011    | Q3, 2011    | Q4, 2011    |
|                                                         | GAS PLANT               | PRODUCTION | PRODUCTION | PROJECTION | PROJECTION  | PROJECTION  | PROJECTION  | PROJECTION  | PROJECTION  |
| 1                                                       | UTOROGU                 | 300        | 300        | 300        | 360         | 360         | 360         | 360         | 510         |
| 2                                                       | OBEN                    | 90         | 90         | 90         | 90          | 90          | 90          | 90          | 90          |
| 3                                                       | SAPELE                  | 50         | 50         | 50         | 50          | 50          | 50          | 50          | 50          |
| 4                                                       | UGHELLI EAST            | 80         | 80         | 80         | 80          | 80          | 80          | 80          | 0           |
| 5                                                       | CHEVRON PHASE I         | 0          | 200        | 200        | 200         | 200         | 200         | 200         | 200         |
| 6                                                       | CHEVRON PHASE II        | 0          | 0          | 0          | 180         | 180         | 180         | 180         | 180         |
| 7                                                       | PAN OCEAN               | 0          | 0          | 65         | 65          | 65          | 65          | 65          | 65          |
| 8                                                       | NPDC                    | 0          | 0          | 0          | 60          | 60          | 60          | 60          | 60          |
|                                                         | <b>TOTAL PRODUCTION</b> | <b>520</b> | <b>720</b> | <b>785</b> | <b>1085</b> | <b>1085</b> | <b>1085</b> | <b>1085</b> | <b>1155</b> |

As shown in the Table above, the single cause of this increase in gas supply was the return to service of gas from the Chevron Phase 1 plant (an extra 200 MMscfd). It is projected that by the end of 2010, an additional 365 MMscfd of gas is expected to be added to the ELP System.

#### 1.2 However, pressure will need to be exerted to ensure that the additional gas supply projected is made available on the Western Axis within the next 12 months

##### Gas production

As at July 16 2010, the installed available capacity of power plants on the Western Axis was just under 2,000 MW requiring a gas supply equivalent to approximately 560 MMscfd. This was less than the 595 MMscfd available to power plants (i.e. the 720 MMscfd minus the gas made available direct to industrial consumers and the West African Gas Pipeline).

However, as shown in the table below, the government is aiming to add 1,615 MW in additional power generation capacity on the Western Axis within the next 12 months.

| Expected Additional Capacity<br>in the next 12 months | MW    | Time Line | MMscfd<br>Requirement |
|-------------------------------------------------------|-------|-----------|-----------------------|
| Egbin (PHCN)                                          | 220   | Dec-10    | 64                    |
| Sapele (PHCN)                                         | 120   | Dec-10    | 36                    |
| Omosho (PHCN)                                         | 38    | Dec-10    | 11                    |
| Olorunsogo (PHCN)                                     | 38    | Dec -10   | 11                    |
| Olorunsogo (NIPP)                                     | 225   | Dec -10   | 65                    |
| Delta (PHCN)                                          | 20    | Apr -11   | 6                     |
| Omosho (PHCN)                                         | 76    | Apr-11    | 22                    |
| Olorunsogo (PHCN)                                     | 90    | Apr-11    | 26                    |
| Sapele (NIPP)                                         | 225   | Apr-11    | 65                    |
| Olorunsogo (NIPP)                                     | 225   | Apr-11    | 65                    |
| Gbarain (NIPP)                                        | 113   | Apr-11    | 32                    |
| Ihovbor (NIPP)                                        | 225   | Apr-11    | 65                    |
| Total increase                                        | 1,615 |           | 459                   |
| Total increase given 85% capacity factor              | 1,373 |           | 398                   |

Assuming an 85% capacity factor, this additional generating capacity will require an additional 398 MMscfd of gas. Thus, the total supply of gas on the Western Axis will need to rise to nearly 1,000 MMscfd within the next 12 months<sup>5</sup>.

As shown in the previous section, the current projection (in line with the timelines agreed by NGC, NPDC and the International Oil Companies) is that gas supply on the ELPS will rise to 1,085 MMscfd within the next 12 months.

The critical dependency here is the speed at which the Chevron Phase II gas supply (180 MMscfd) can be brought on stream and the completion of related infrastructure. The other two plants – Pan Ocean and NPDC – are also important and their progress is being monitored with equal vigour.

The Task Force is currently obtaining regular progress updates from the respective owners of these three “under development” gas supply facilities.

#### Related gas infrastructures

Sufficient gas *production* is not the only condition required for ensuring that all the power plants in the Western Axis have sufficient gas to meet their available capacity over the next 12 months. Attention is also being focused on related pipeline infrastructures.

The good news is that the gas pipeline from the Pan Ocean facilities has already been connected to the ELP system and the gas supply pipeline to Omosho and related metering facilities have been substantially completed and it has since been operational.

<sup>5</sup> Assuming there is no significant increase in supply/demand on the West African Gas Pipeline.

However, the following critical projects will need to be undertaken in the very near term:

- To assure gas supply from the NPDC Oredo field, the NIPP will be required to complete the pipeline link to the ELP.
- The ability to take Chevron's 180 MMscfd will require the completion of Phase 1 of the ELP expansion and Chevron will need to complete the Escravos River Crossing and an offshore pipeline into Escravos terminal. ***But, lack of funding and intermittent community disruptions are critical problems that could threaten the timely completion of these pipelines.***
- A temporary pipeline is in place to connect Olorunsogo Phase 1 to the ELPS pipeline and this will cater for the full requirement of its Phase 1 plant. Some gas can be supplied to the Phase 2 plant if Phase 1 is not fully operational. But this will not be sufficient to power the two plants optimally. The permanent connection of Olorunsogo Phase 2 plant to the ELPS is currently being retendered due to the disengagement of the original Contractor arising from his non performance. ***However lack of funding is a critical problem here and could threaten the timely completion of these projects.***

## 2.0 Short Term Supply of Gas on the Eastern Axis

### 2.1 At present, there is enough gas ***production*** but not enough gas ***transportation*** to fuel all the available power generating capacity on the Eastern network

As at the end of Q2, 2010, the maximum amount of gas that could be delivered to all the power plants on the Eastern Axis was just 301 MMscfd which was equivalent to 1,513 MW, 400 MW of which is coming from the combined cycle module. It should also be noted, that of this total of 301 MMscfd, 277MMscfd consists of gas that is directly tied to power plants and is not on the NGC network (viz Afam VI, Okpai and Omoku RVSG).

The total amount of gas (301 MMscfd) is just sufficient to fuel all the currently available generating capacity on the Eastern Axis. As shown in the table below, the installed *available* power generating capacity as at July 16<sup>th</sup> 2010 amounted to a total of 1,470 MW.

| Installed Available Capacity as at 16/7/2010 | MW    |                | MMscfd Requirement |
|----------------------------------------------|-------|----------------|--------------------|
| Ibom                                         | 185   |                | 53                 |
| Afam I-V                                     | 0     |                | 0                  |
| Afam VI                                      | 650   | Combined cycle | 114                |
| Okpai                                        | 460   | Combined cycle | 75                 |
| Omoku                                        | 75    |                | 22                 |
| Trans Amadi                                  | 100   |                | 29                 |
| Total                                        | 1,470 |                | <b>293</b>         |

However the major problem on the Eastern Axis is not the ***production*** of gas but the ***transportation*** of gas. For example, Ibom Power is reduced to generating just 80 MW

instead of its full 185 MW capacity because it cannot access excess gas elsewhere in the region. For example:

- Gas supply to Rivers State Power Plant at Omoku underutilises available gas of 37 MMscfd and 60 MMscfd of gas is available for the NIPP Omoku Power plant which is not yet ready (however, the excess gas available to both these plants in Omoku cannot be transported to other power plants e.g. Ibom Power).
- In Bonny, 100 MMscfd of Exxon Mobil gas supply is stranded and awaiting an outlet to the Eastern grid or a gas user. In addition, 90 MMscfd of gas is to be produced by NNPC/NAOC and will be stranded if the OB3 pipeline is not available.

## **2.2 However, over the next 12 months, considerable investment will be required to remove bottlenecks not just in gas transportation but also (to a lesser extent) in gas production**

As shown in the table below, the government is aiming to add just over 655 MW in additional power generation capacity on the Eastern Axis within the next 12 months. Assuming an 85% capacity factor, this additional generating capacity will require, at the very least, an additional 160 MMscfd of gas.

| <b>Expected Additional Capacity<br/>in the next 12 months</b> | <b>MW</b> | <b>Time Line</b> | <b>MMscfd<br/>Requirement</b> |
|---------------------------------------------------------------|-----------|------------------|-------------------------------|
| Alaoji (NIPP)                                                 | 126       | Dec-10           | 36                            |
| Afam I-V (PHCN)                                               | 403       | Apr-11           | 116                           |
| Alaoji (NIPP)                                                 | 126       | Apr-11           | 36                            |
| Total increase                                                | 655       |                  | 188                           |
| Total increase given 85% capacity factor                      | 557       |                  | <b>160</b>                    |

### The Afam Challenge

Because Afam VI already consumes almost all the gas that is currently available from the Okoloma gas plant (180 MMscfd), the only way that gas delivery to Afam I-V can keep pace with the targeted rehabilitation of 403 MW (by April 2011) is to ensure the following:

- The timely completion of the revamping of the Alakiri gas plants (to increase gas volumes from the current 50 to 120mmscfd); and
- The timely expansion of the Obigbo North NAG Plant (by 45mmscfd), which in turn requires the relocation of a community in the vicinity of the Gas plant.

Thereafter (in the second half of 2011), if the expansion of the Okoloma field is completed according to current projections, the threat of a gas constraint at Afam I-V would no longer exist.

|   |                  | Q1, 2010              | Q2, 2010 | Q3_2010              | Q4_2010 | Q1_2011 | Q2_2011 | Q3_2011 | Q4_2011 |
|---|------------------|-----------------------|----------|----------------------|---------|---------|---------|---------|---------|
|   | Gas Plant        | Production Capability |          | Projected Capability |         |         |         |         |         |
| 1 | Okoloma          | 180                   | 180      | 180                  | 180     | 180     | 180     | 240     | 240     |
| 2 | Alakiri          | 50                    | 50       | 50                   | 50      | 50      | 50      | 50      | 50      |
| 3 | Obigbo North AGG | 15                    | 15       | 15                   | 15      | 15      | 15      | 15      | 15      |
| 4 | Imo River AGG    | 5                     | 5        | 5                    | 5       | 5       | 5       | 5       | 5       |
| 5 | Obigbo North NAG | 0                     | 0        | 0                    | 0       | 45      | 45      | 45      | 45      |
| 6 | Total MMscfd     | 250                   | 250      | 250                  | 250     | 295     | 295     | 355     | 355     |

The Task Force has asked the owners of these gas plants to submit regular progress reports and draw the PACP's attention to any slippages or delays.

### The Alaoji Challenge

Whereas the keys to solving the "Afam Challenge" revolve around increases in gas production, gas **transportation** is the key to supplying enough gas to fuel the 252 MW of power which is targeted to be available at the Alaoji NIPP by April 2011. And the critical dependency here is the speed at which the pipelines connecting Alaoji Power can be completed.

In Alaoji a similar approach of disengaging the Contractor has been taken and a temporary 18" pipeline of 5km has been re-tendered and is at the point of being re-awarded to a new contractor while the permanent line is undergoing re-tendering like the Olorunsogo line.

***However lack of funding is a critical problem here and could threaten the timely completion of this project.***

Moving forward, the Task Force has asked the contractors responsible for building the pipelines to Alaoji Power plant to provide regular progress reports.

### The Ibom Challenge

Ibom Power is running on gas supplied from the NGC Eastern Grid and it has a contract in place for this with NGC. However, as noted earlier, it is currently reduced to generating just 80 MW instead of its full 185 MW capacity because of insufficient gas supplied by NGC. To remove this constraint, the company has signed a gas supply and transportation agreement with Septa Energy and the expectation is that this agreement will enable Ibom Power to utilise its full capacity early in the new year (provided that ongoing work on new transmission lines is completed on time so that the additional capacity can be evacuated).

### 3.0 Other Short Term Challenges

#### 3.1 Security concerns

Past experience has shown that acts of sabotage on the ELPS and on the Trans-Forcados crude and condensate evacuation pipeline system can cause serious and protracted interruptions to the gas supply to power plants on the Western Axis. The strategies for mitigating this risk fall under two main headings, namely *preventative measures* and *resilience building*.

Over the next 12 months, reliance will have to be placed primarily on *preventative measures* such as:

- Increased physical security measures to prevent economically motivated sabotage (e.g. condensate theft);
- Good community relations to prevent politically motivated sabotage.

By contrast, although *resilience building* measures are essential, most of these measures will take several years before they come on stream. Nevertheless, there are one or two steps which could begin to exert a small but noticeable impact upon the resilience of the gas pipeline network within the next 12 months.

The opportunities available include installation of storage facilities in gas plants like Oben and Sapele and increasing the storage capacity in Utorogu to increase the endurance available in case the Trans-Forcados pipeline is vandalised. More permanent solutions would involve the construction of gas alternate crude /condensate evacuation pipeline networks.

Moving forward, therefore, the Task Force will investigate, and if viable, recommend development of tankage facilities at the Oben and Sapele gas plants and a new pipeline alternate route to Escravos for evacuation of liquids and condensates in lieu of Forcados. In addition to this, the Taskforce will also evaluate and recommend pipeline surveillance and security systems to be implemented.

#### 3.2 Effects of temporary shut downs of gas plants for upgrading/maintenance work

The process by which gas plants are shut down for temporary upgrading/maintenance work (and the timing thereof) poses a number of short term risks – the most importance of which is the potential for these shutdowns to reduce gas supply to the nation due to non-commissioning of vital control facilities at Utorogu, the biggest gas plant in the domestic market in particular. The shutdown is required to increase the reliability of the plant as it will thereafter be able to operate automatically and with minimal human interface.

The plant will be in a state of total shutdown for 10 days (and at partial operation for the remaining period of commissioning) and the effect on the nation's power supply will be

significant. To mitigate the negative impacts of this event, the following steps are being (or will need to be) taken:

- a) Every aspect of the work required to commission the control system has been carefully planned;
- b) Remaining gas supply sources will be checked for availability;
- c) The extent to which strategic water management at the Hydro stations can be used to smoothen out the impact of the Utorogu shut down is also being articulated;
- d) Power plants (such as Egbin) which can run on alternative fuel supplies (e.g. LPFO) have built up their stock of reserves to the maximum extent possible during the period.
- e) The System Operator will need to prepare a strategic load shedding plan for implementation for the duration of the shutdown if required;
- f) Consumers will need to be warned in advance of the likely impact on their power consumption and the likely duration thereof;
- g) Supply to industrial consumers and the West African Gas Pipeline may need to be temporarily reduced.

In the very short term, the Task Force will work to ensure that all of the steps outlined above are effected prior to the temporary shut down of the Utorogu Gas Plant.

### 3.4 Gas supply and purchase agreements

The transition to the approved economic gas tariff (under the Gas Pricing Policy) will help to stimulate increased gas supply over the *medium to long term*. But the negotiation and signing of these agreements is an issue to be addressed in the *short term* to provide confidence for the investors to be committed to the business.

Some progress has already been made in this direction – with the signing of the Gas Supply Aggregation Agreement (GSAA) between Egbin Power Station, PHCN and Pan Ocean while Shell and Chevron are finalising their plans for signing the remaining two agreements for gas supply to Egbin Power plant. But further and rapid progress needs to be made in order to ensure that similar GSAA's are put in place in respect of other power plants.

It is pertinent to state that signing of the GSAA's will provide confidence for gas suppliers to continue to invest on the understanding that the commercial operational environment is being entrenched in the industry. Similarly the Gas Transport Agreement (GTA) needs to be expedited to enable a full closure of the loop and the Network Code needs to be concluded as soon as possible. In the Eastern axis, there is a pressing need for Gas swap agreements to be concluded for the utilisation of ExxonMobil gas available in Bonny as well as 60 MMscfd of Gas available from Total at Obite. However, gas swap issues are ultimately more relevant to the medium to longer term gas supply rather than the short term.

Over the next three months, the Fuel-to-Power team in the Task Force will be closely monitoring progress on this front.

## 4.0 Fuel for Emergency Power Plants

To date, unutilised gas is available both in the eastern and western parts of the country. The situation will worsen if the expected additional gas materialises without commensurate available power plants or transmissions and /or distribution facilities. Any plan for emergency power should seek to utilise the non-utilised gas as a matter of priority. Should this be exhausted, options of LNG, LPG and SNG may be considered provided they are cost effective and the scheme evaluated to be realistic and achievable.

## 5.0 Medium to Long Term Challenges

### 5.1 Security of gas supply in the medium term

One of the principal challenges in the medium term (the next 3 to 5 years) is the need to substantially strengthen the resilience of the gas network i.e. to ensure that it can cope with supply line disruptions.

#### 5.1.1 Sustainability of Gas Supply

The critical medium-term projects which will help to build this resilience are as follows:

- a) The ELPS Phase 2 Oben Node to Itoki;

The Contract for ELPS Phase 2 which will double the capacity of the gas supply infrastructure to the Western area of the country (the largest demand source in Nigeria) is an ongoing project. Progress has been hampered by lack of funding even though it is a Federal Government Project as no funds were appropriated for the project. It is expected that the project could be completed by the end of 2012 if funds are provided now. ***The non-availability of this pipeline will effectively block any significant growth of power supply along the ELPS pipeline corridor.***

- b) The OB<sup>3</sup> pipeline link to the Western network

The Obriafu/Obrikom to Oben (OB3) pipeline is a strategic pipeline system designed to link the gas rich central/eastern part of Nigeria to the demand centre in the Western part of the country and provide an additional source of gas supply to the North. It will additionally introduce flexibility in the management of demand and supply within the country. ***The project has been tendered for but, as with the ELP Phase 2, it has not been funded. The estimated implementation period is 18 months.***

#### 5.1.2 Sustainability of Supply on the Eastern Axis

On the Eastern Axis, the Task Force is looking closely at a number of options for accelerating several projects, the combination of which will ultimately result in an ***interconnected gas network*** that will provide added stability and security of fuel supply to several large NIPP and IPP power plants. These include the following projects:

- a) An West-East pipeline from Port Harcourt to the Calabar Power Plant (which is currently being constructed by Oando under a BOT contract with NGC);
- b) An East-West pipeline from Uquo to Ibom Power in Ikot Abasi (which is currently being built by Septa Energy);
- c) A South-North pipeline rehabilitation and extension which will connect Ikot Abasi to Alaoji (the contract for which is about to be awarded as described in Section 2.2 of this chapter );
- d) An additional West-East pipeline from gas fields in Akwa Ibom to Calabar (which is currently being considered by the NIPP);
- e) Expediting the Calabar- Enugu- Ajaokuta pipeline to avail gas to Ajaokuta and to serve as an alternative to the **Trans-Nigeria** pipeline (the project will also promote the domestic utilisation of gas in the eastern part of the country).

#### 5.1.2 Sustainability of Supply on the Northern Axis

The national gas masterplan has envisaged development of power and gas industries across the east and northern axis. The proposed development of the **Trans-Nigeria Pipeline System (TNPS)** is a reflection of this intention. However the implementation of the project requires large amounts of both capital investment and political will. It should also be noted that the Gas Master Plan envisages a critical link between Obrikon to Ajaokuta which would provide additional supply to Geregu, Ajaokuta and Obajana and serve as a secondary supply route to the northern axis.

Although the challenges described above can only be met within the medium to long term, it is vital that progress thereto begins *now*. And a modest, but important, step in that direction involves the development of a Network Nodal Analysis.

Over the next three months, the Fuel-to-Power team in the Task Force will work in close conjunction with the strategic aggregator and the board of the NIPP to improve the security of gas supply in the Eastern Grid in light of existing commitments and ongoing proposed projects.

### **5.2 Expansion of gas production, gas processing and gas transportation in the long term**

Gas is the biggest immediate source for power plant fuel in Nigeria. And it is likely to remain the most important source of power plant fuel for several decades to come. However, the scale of the requisite investment in the country's gas production, gas processing and gas transportation infrastructures is enormous.

At present, total gas production (on both the Western and Eastern axes) for use by power plants (circa 900 MMscfd) is only just sufficient to fuel the available gas-fired generating capacity of 3,382 MW. On the assumption that the country should aim to have at least

30,000 megawatts of gas-fired generating capacity by 2020, the total gas production for use by power plants will have to rise to above 8 Bscfd if open cycle power plants are installed and about 5.5 Bscfd if combined cycle plants are installed. The policy implications of this suggest that amongst other things, all future gas fired plants should either be built *de novo* as combined cycle plants or should be designed to be convertible thereto.

Moreover, the scale of the gas volumes needed over the coming decades will require tens of billions of dollars – far greater than anything which the government can fund. It is essential, therefore, that the private sector is incentivised to make these huge investments in the domestic gas industry. It is also essential that Contracts for gas supply are in place at the time of Financial Investment Decisions on power plants projects, so as to enable gas suppliers and infrastructure development agencies commit to developing and supplying the required gas supply for the power plants. To help kick-start these investments, the government will need to do the following:

- a) Ensure that approved price to be paid to gas producers remain close to export parity price to LNG plants or other export projects in Nigeria (thereby removing any advantage that LNG currently has) and most importantly that this price is passed through to electricity consumers;
- b) Engage actively with both the large IOCs and smaller independent gas companies;
- c) Provide, where necessary, FGN-backed credit support so that gas suppliers can secure the finance required for their investments (particularly in the interim period between the wind-down of PHCN and the medium-term evolution of a power generation sector comprising financially viable, credit-worthy, gas off-takers);
- d) Support right-of-way land acquisition for pipeline laying as required/requested;
- e) Ensure the formation of a gas regulation office;
- f) Complete the gas contracting framework: This is very urgent, because with only the GSAA in place the power stations are taking all the gas transportation risks and this results in the very probable event of gas being paid for at the metering point and not arriving at the point of use.
- g) Ensure the formation of an independent regulated gas transportation business.

Over the next six months, the Fuel-to-Power team in the Task Force will monitor the progress of the Strategic Aggregator in gas allocation, the implementation of the approved pricing policy and the signature of GSAAAs and GTAs.

### **5.3 The promotion of hydro power and other alternative fuels**

For the foreseeable future, Nigeria will remain heavily dependent upon gas for its power generation. Nevertheless, there is room for some limited growth in hydro power plants, coal-fired power plants, and other sources of renewable power e.g. wind and solar. The government's policy in respect of all these sources of power is described in Chapter 4 (on power generation).

## Ch.4 – Generation

### 1.0 Introduction

#### 1.1 Current generation capability

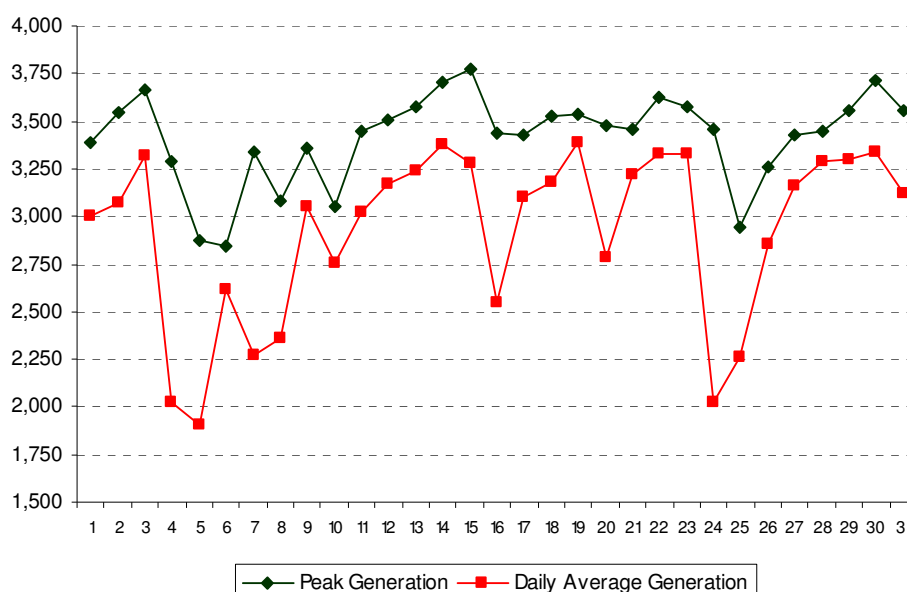
As at the end of July 2010, the total actual (on-grid) power generation capacity stood at 4,612 MW, of which the thermal plants accounted for 3,382 MW and the hydro plants accounted for 1,230 MW. However, not all of this actual capacity can be used full-time throughout the year, for the following reasons:

- The average annual generation from the three Hydro plants (Kainji, Jebba, and Shiroro) is capped at an average of **950 MW** per annum given the available year-round water flow.
- As described in Chapter 3 (on Fuel-to-Power), the increase in gas availability on the Western Axis means that the available thermal power plants (as at July 2010) are no longer constrained. Moreover, the total actual generation capacity of these thermal plants (3,382 MW) is significantly less than their total installed capacity (6,539 MW). In theory, therefore, the actual generation capacity of 3,382 MW should correspond to the annual average generation. In practice, however, much of the gap between total installed capacity and actual generation capacity can only be restored through major rehabilitative work. And in the meantime, the currently available units will still be subject to temporary equipment failures and the need for routine maintenance. Hence, at best, only 85% (**2,875 MW**) of the actual generation capacity of the thermal units can be treated as the available annual average.

Thus, as shown in the table below, the annual average generation for all grid-connected power plants as at the end of July 2010 stood at approximately 3,825 MW.

|         | As at July 2010                                           |      |       |       |                      |                                     |
|---------|-----------------------------------------------------------|------|-------|-------|----------------------|-------------------------------------|
|         | Actual Generation Capacity of Grid Connected Power Plants |      |       |       | Available Annual Avg | Note                                |
|         | PHCN                                                      | NIPP | IPP   | All   |                      |                                     |
| Hydro   | 1,230                                                     | 0    | 0     | 1,230 | 950                  | <i>given available water flow</i>   |
| Thermal | 1,862                                                     | 0    | 1,520 | 3,382 | 2,875                | <i>Assuming 85% capacity factor</i> |
| Total   | 3,092                                                     | 0    | 1,520 | 4,612 | 3,825                |                                     |

This figure of 3,825 MW is just above the higher end of the peak generation figures recorded in July 2010 (as shown in Figure 1 below).

**Figure 1: Total peak and off-peak generation for all grid-connected power plants in July 2010**

### 1.2 Capacity additions from rehabilitation of PHCN power plants and the commissioning of NIPP plants (most of which have already been funded and should not require additional spending by the FGN)

The maximum amount of generation capability that could be recovered through the rehabilitation of existing PHCN power plants is currently estimated at 2,854 MW. To a large extent, the cost of these repairs has already been budgeted for and does not require new capital allocations from the FGN. Nonetheless, some of these projects are likely to require *additional* budgetary allocations before they can be completed and the Presidential Task Force on Power is in the process of identifying and validating these.

Over the past 5 years, the Federal Government of Nigeria has committed itself to spending several billion dollars on the construction of 10 new power plants owned by the Niger Delta Power Holding Company under the National Integrated Power Project. Assuming that all of these power plants are eventually commissioned, they should contribute an additional 4,775 MW of installed capacity. To a large extent, the cost of commissioning these plants has already been budgeted for and does not require new capital allocations from the FGN.

### 1.3 How will the country pay for the vast increases in generation capacity that will be required beyond the completion of the PHCN rehabilitations and the NIPP?

As described in the preceding section, the funds which the FGN has already invested and/or budgeted should result in an increase in total generating capacity from 4,612 MW to just over 12,000 MW (i.e. with the addition of 2,854 MW from the PHCN rehabilitations and 4,775 MW from the NIPP).

But this figure of 12,000 MW is only 10% of the generating capacity per capita which South Africa currently possesses. By the year 2020, the Government's policy objective is that Nigeria should possess a generating capacity of at least 40,000 MW. Given Nigeria's rate of population growth, 40,000 MW would still be less than 25% of South Africa's generating capacity per capita; but it would be sufficient to allow for a significant growth in: manufacturing industry; jobs; tax revenues and ultimately GDP per capita.

However, the investments required to finance an increase in total power station capacity from 12,000 MW to 40,000 MW are vast. On a conservative estimate, this growth in capacity would require 36 billion US dollars – far more than the Government can afford to pay for (given its existing tax revenues).

#### **1.4 The implications for future government spending**

In view of the facts described above, the implications (in terms of future government spending on the power generation sector) can be stated as follows:

##### **1.4.1. The vast majority of all new power plants should be financed and built by the private sector**

The Government is determined that the vast majority of all new power plants should be financed and built by the private sector. This is particularly true of all gas-fired power plants which are likely to represent the cheapest (and hence most competitive) form of power generation for at least the next 10 to 15 years.

In order to stimulate the requisite private sector investments, the Government is therefore committed to a package of key "enabling" reforms, the details of which can be found in Section 3.2 of this Chapter.

##### **1.4.2. Any medium to long term investments by the FGN in power plants should be highly selective**

Over the medium to long term, the Government acknowledges that there is a case for some limited involvement by the FGN in the financing of renewable forms of power generation e.g. hydro (or other renewables) and in stimulating production of power from coal. However, it also acknowledges that the support for such power generation technologies should, where appropriate, be in the form of preferential feed-in tariffs rather than direct capital injections by the FGN.

Notwithstanding the policy objective described above, the Federal Government is completing pre-existing plans that will lead to commencement of construction of the following plants:

- a) A 2,600 MW hydro plant in Mambilla
- b) A 700 MW hydro plant in Zungeru
- c) A 300 MW expansion of the hydro plant in Gurara
- d) A 200 MW dual-fired power plant in Kaduna

## 2.0 Short Term Challenges

### 2.1 The PHCN rehabilitation challenge

The Dec 2010 challenge – in terms of the rehabilitation of existing PHCN power plants owned by the FGN – is to increase the actual generation capacity from 3,092 MW to 3,508 MW through the following projects:

- 220 MW from Egbin Unit ST01
- 38 MW from Omotosho Unit GT8
- 38 MW from Olorunsogo Unit GT6
- 120 MW from Sapele Unit ST03

Thereafter, by April 2011, the goal is to increase the actual generation capacity of PHCN power plants to 4,244 MW through the following projects:

- 265 MW from Afam Units GT17, GT18 and GT19
- 138 MW from Afam Unit GT20
- 150 MW from Shiroro Unit 411G2
- 20 MW from Delta Unit GT04
- 76 MW from Omotosho Units GT6 and GT7
- 90 MW from Olorunsogo Units GT3, GT5 and GT8

### 2.2 The NIPP commissioning challenge

The Dec 2010 challenge – in terms of the commissioning of new NIPP power plants – is to bring on stream 351 MW of brand new capacity from the following two projects:

- 126 MW from Alaoji
- 225 MW from Olorunsogo

Thereafter, by April 2011, the goal is to increase the actual generation capacity of NIPP power plants to 1,266 MW through the following projects:

- A further 126 MW from Alaoji
- A further 226 MW from Olorunsogo
- 225 MW from Sapele
- 125 MW from Ihovbor
- 113 MW from Gbarain

### 2.3 The combined increase in the annual average generation

As described in the previous section, the annual average generation is always lower than the actual generation capacity (because the water flow at the hydro plants limits the annual average generation to 950 MW and the impact of temporary equipment failures and the

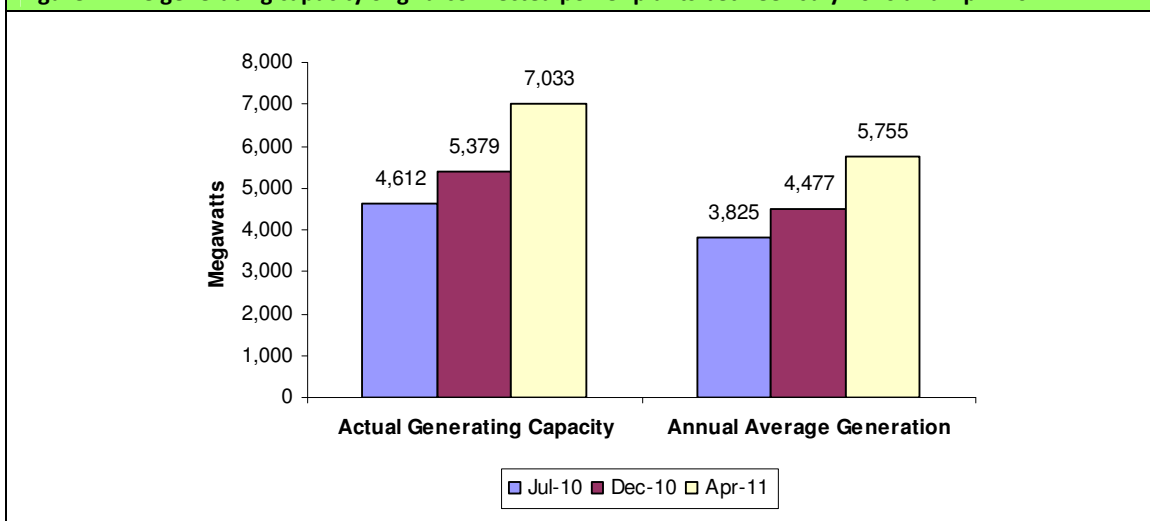
need for routine maintenance means that the capacity factor – even for brand new thermal plants – will rarely exceed 85%).

Thus, although the total actual generating capacity is targeted to increase from 4,612 MW to 7,033 MW by April 2011, the more meaningful set of figures (from a planning perspective) is the increase in the annual average generation from 3,825 MW to 5,755 MW. Both sets of figures are shown in the tables and the figure below.

|         | By December 2010                                          |      |       |       |                      |                                     |
|---------|-----------------------------------------------------------|------|-------|-------|----------------------|-------------------------------------|
|         | Actual Generation Capacity of Grid Connected Power Plants |      |       |       | Available Annual Avg | Note                                |
|         | FGN                                                       | NIPP | IPP   | All   |                      |                                     |
| Hydro   | 1,230                                                     | 0    | 0     | 1,230 | 950                  | <i>given available water flow</i>   |
| Thermal | 2,278                                                     | 351  | 1,520 | 4,149 | 3,527                | <i>Assuming 85% capacity factor</i> |
| Total   | 3,508                                                     | 351  | 1,520 | 5,379 | 4,477                |                                     |

|         | By April 2011                                             |       |       |       |                      |                                     |
|---------|-----------------------------------------------------------|-------|-------|-------|----------------------|-------------------------------------|
|         | Actual Generation Capacity of Grid Connected Power Plants |       |       |       | Available Annual Avg | Note                                |
|         | FGN                                                       | NIPP  | IPP   | All   |                      |                                     |
| Hydro   | 1,380                                                     | 0     | 0     | 1,380 | 950                  | <i>given available water flow</i>   |
| Thermal | 2,867                                                     | 1,266 | 1,520 | 5,653 | 4,805                | <i>Assuming 85% capacity factor</i> |
| Total   | 4,247                                                     | 1,266 | 1,520 | 7,033 | 5,755                |                                     |

**Figure 2: The generating capacity of grid-connected power plants between July 2010 and April 2011**



## 2.4 If the short term challenges are met, what impact will this have on the experience of the average electricity consumer?

As indicated above, if all the short term increases in generation capacity are reached by April 2011, the total annual average generation of grid-connected power plants will rise from about 3,825 MW to circa 5,755 MW. This begs the question, however, as to what this means for the average electricity consumer? Is it possible, for example, to say anything

concrete about the impact this might have on the “additional” hours of electricity received by the average consumer?

In part, the answer to this question can be answered as follows:

- Is there sufficient gas to fuel the increase in the thermal generating capacity? As indicated in Chapter 3, the projected increases in gas availability by April 2011 should be more than sufficient to power 5,755 MW of power generating capacity.
- Is there sufficient transmission and distribution capacity to ensure that 5,755 MW of power generation is actually delivered to customers? As indicated in Chapters 5 and 6, the projected increases in transmission and distribution capacity should prove more than sufficient.

However, the statements above only furnish a *partial answer* – in so far as they only provide reassurance that the increase in power generating capacity to 5,755 MW will not be *stranded*. They don’t provide an answer to the knottier question of what this “translates into” in terms of the daily experience of the average electricity consumer.

The truth of the matter is that it is not possible to furnish any detailed projections as to the additional “number of hours of electricity” that will be received by electricity consumers in different parts of the country if all the short-term targets are met (for gas supply, generation, transmission and distribution).

But there are other ways of translating the megawatt targets described above into statements which can be readily understood by the general public. And the most important way of expressing this figure is to state the following:

*If the short term targets for generation (plus gas supply, transmission and distribution) are met, the supply of power will not only be significantly greater than ever before...it will also be much less erratic.*

Over the past few years – during which the annual average generation stood at 3,000 MW or less – the daily pressure to “run the machines into the ground” has been hard to resist. And this, in part, is responsible for poor equipment maintenance and highly erratic and unpredictable patterns of power generation.

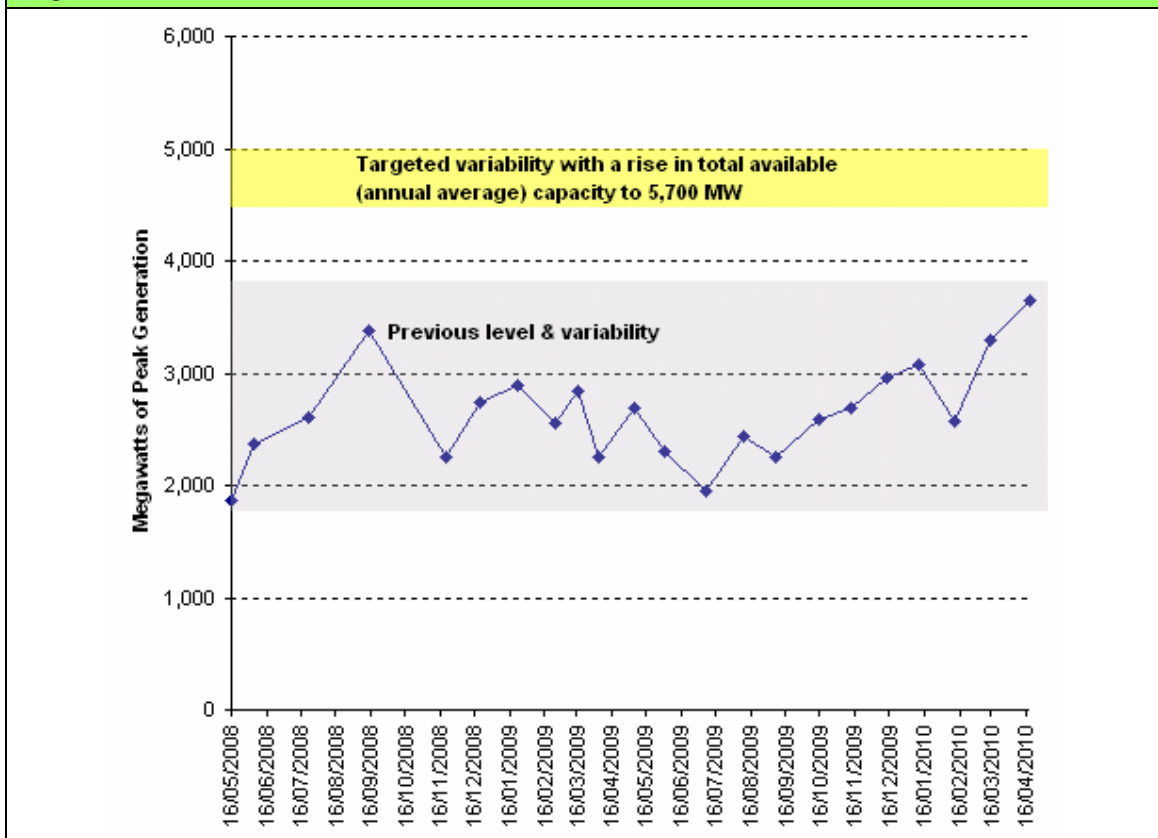
However, as indicated in the Transmission Chapter of this Roadmap, the Government’s projected targets for April 2011 are that the “true deliverable” transformation capacity will rise by just over 10% to about 5,000 MW equivalent (even though the total nominal 330kV transformation capacity is projected to rise to 5,995 MW equivalent).

Although this transformation bottleneck represents a critical bottleneck (and one that needs to be urgently addressed), it does have a silver lining – in so far as this evacuation constraint will enforce a substantial degree of spinning reserve that will allow the system operator to maintain generation levels at a relatively steady 5,000 MW *instead of being tempted into running all the available machines flat out*.

More importantly, the Government will also be urging the System Operator and the various distribution companies to undertake more strategic and more predictable load-shedding practices. This policy reflects the Government's acknowledgement that a modest increase to a new, steady and predictable level of electricity distribution is of significantly greater value to electricity consumers than a higher (nominal) increase which ultimately proves to be highly erratic.

The hitherto erratic pattern of power generation can be seen in the graph below which charts the fluctuations in peak generation between May 2008 and April 2010. Laid on top of this data is the higher **and much narrower** band within which the system operator will aim to "hold steady" the country's power generation during 2011.

**Figure 3: The level and variability of power generation between May 2008 and April 2010 and the respective targets for 2011**



### 3.0 Medium Term Challenges

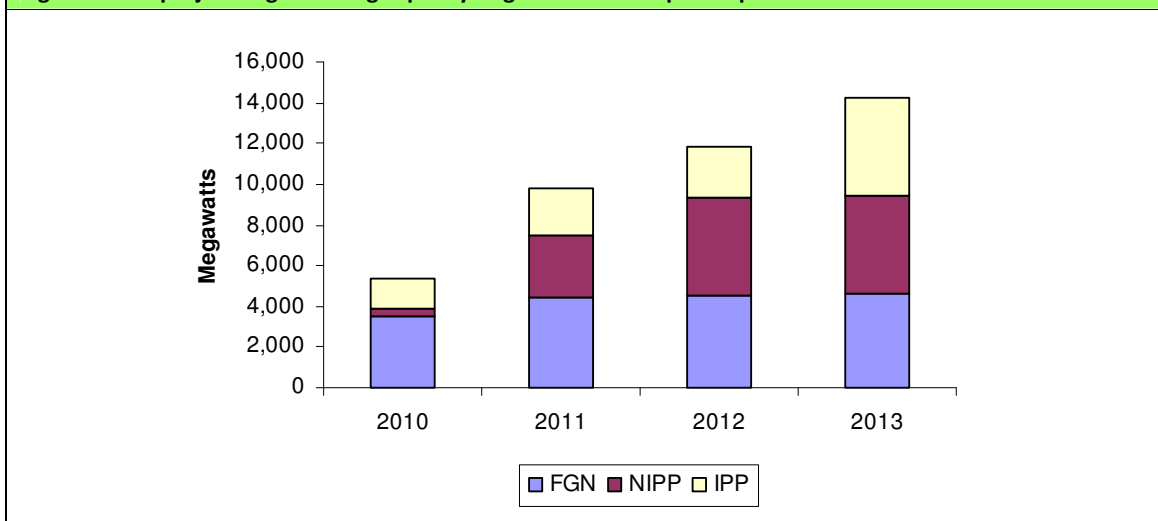
#### 3.1 The Completion of all the NIPP plants

As described in the previous section, the short term target for the NIPP plants is to bring on stream 1,266 MW of new capacity by April 2011. Thereafter, the medium term challenge is to complete all of the planned NIPP power plants no later than December 2012 and thereby bring on stream an additional 3,509 MW of new capacity.

This increase in capacity will come from the following projects:

- A further 709 MW from Alaoji
- A further 226 MW from Sapele
- A further 225 MW from Olorunsogo
- 563 MW from Calabar
- A further 226 MW from Ihovbor
- A further 112 MW from Gbarain
- 338 MW from Egbema
- A further 225 MW from Omoku
- 434 MW from Geregu
- 451 MW from Omotosho

**Figure 4: The projected generating capacity of grid-connected power plants between Dec 2010 and Dec 2013**



#### 3.2 Commissioning 3,300 MW of new IPP capacity by December 2013

As described in the introduction to this chapter, the Government is committed to the principle that the vast majority of all new power plants must be financed and built by the private sector. However, because power plants – even under the best of circumstances – typically take at least 2 years to build and commission, the Government’s modest (but realistic) objective is that at least 3,300 MW of *new* IPP generating capacity should come on stream by December 2013.

However, the Government acknowledges that it cannot *force* the private sector to make these investments in the power generation sector. Its role here is simply to make sure that it moves, with speed, to implement the reforms which will *enable* the private sector to undertake these initiatives.

In terms of immediate priorities, the steps which need to be taken before the end of 2010 comprise the following:

- The reconstitution of the National Electricity Regulatory Commission;
- A clear commitment to a substantial increase in the ceilings below which wholesale tariffs can be negotiated under power purchase agreements – to ensure that tariffs are sufficient to cover the requisite return on investment;
- The operationalisation of the newly incorporated Nigerian Bulk Electricity Trading Company PLC so that it is ready and able to negotiate and sign power purchase agreements with power producers;
- The provision, where necessary, of FGN-backed credit enhancement support so that IPPs can secure the finance required for their investments (particularly in the interim period between the wind-down of PHCN and the medium-term evolution of a market for wholesale power generation comprising financially viable, credit-worthy, off-takers).

To be clear: the four steps outlined above comprise the core package of reforms required to kickstart IPP investment in the power generation sector. However, other “reform related” steps will also need to be taken **before the end of 2010** in order to stimulate investment in other parts of the industry. These reforms are described in Chapters 3, 5 and 6 and in Chapter 1 (which provides an overview of all the requisite reforms).

### 3.3 The divestiture of the PHCN power plants

The full and successful divestiture of the PHCN power plants constitutes another short-to-medium term challenge. However, to meet this challenge, a number of critical steps need to be taken **before May 2011**. These include the following:

- Approval by the National Council on Privatisation of the Privatisation Strategies submitted by the BPE;
- The engagement of privatisation transaction advisers;
- The full establishment of NELMCO and the transfer of legacy debt;
- The successful conclusion of negotiations with the labour unions;
- The execution of vesting contracts between the PHCN power plants and the PHCN distribution companies; and
- The conclusion/hand over of the PHCN power plants.

## 4.0 Long Term Challenges

As previously mentioned, the principal long term challenge for the power generation sector in Nigeria resides in the fact that vast investments will need to be made in this sector for decades to come.

In fact, the long-term challenge is so great that it would be fool-hardy for the government to set any hard and fast targets for long-term power generation. As previously indicated in this chapter, the Government's current policy objective is that by 2020 Nigeria should possess a generating capacity of at least 40,000 MW. However, this target will only be reached if the ownership and control of the sector is transferred from the public sector to the private sector – in line with the original aim of the Electric Power Sector Reform Act.

The critical challenge for this Administration, therefore, is to move with the greatest possible alacrity to ensure that this momentous transition occurs without further delay.

## Ch.5 – Transmission

### 1.0 Introduction

The introductory sections below provide a brief statistical overview of all the outstanding transmission projects under the management of PHCN and the NIPP. In total, there are well over a 100 such projects. Over the coming months, each and every one of these projects will be subject to rigorous monitoring. However, each of these projects has also been given a particular *priority* rating. These priority ratings are reflective of three factors:

- The drive to exert the greatest marginal difference within the shortest period of time – i.e. to prioritise “bottleneck” projects;
- The need to match evacuation capacity to the introduction of new generating capacity in the next 12 to 18 months; and
- The desire to strengthen the stability and resilience of the grid.

These priority projects are described in section 2 of this chapter.

### 1.1 Overview of Outstanding PHCN Transmission Projects

In July 2010, the PTFP was provided with a list of outstanding transmission projects under the management of PHCN. The list consisted of 70 projects in total. 8 of these projects were “new projects” or were “being reprocured” (where the contract had not yet been awarded). A further 9 consisted of projects where the identities of the contractors were not clearly specified (i.e. they were simply recorded as “various”).

However, the bulk of the projects (53 in total) were projects where the identity of the contractor was clearly specified. And in most of these cases, there was additional information concerning:

- The total project cost;
- The payments made so far;
- The original completion date (and hence the number of years that the project has been delayed); and
- The “status of completion” expressed in percentage terms

| Table 1: Summary of PHCN Transmission Projects |     |                                      |                                   |                        |                                    |                            |
|------------------------------------------------|-----|--------------------------------------|-----------------------------------|------------------------|------------------------------------|----------------------------|
| Contractor(s)                                  | No. | Total Project Cost in USD Equivalent | Avg Project Cost (USD Equivalent) | Years Overdue (Median) | Avg % of Project Cost Already Paid | Avg % of Project Completed |
| Clearly specified                              | 53  | 704,090,710                          | 13,284,730                        | 4                      | 62%                                | 46%                        |
| "Various"                                      | 3   | 42,094,812                           | 14,031,604                        | NA                     | NA                                 | 47%                        |
| "Various"                                      | 6   | Not specified                        | NA                                | NA                     | NA                                 | NA                         |
| "New projects"                                 | 8   | Not yet determined                   | NA                                | NA                     | NA                                 | NA                         |

As shown in Table 1 above, the total cost of the outstanding transmission projects under the management of PHCN (excluding the new projects) is in the region of USD 750 million and the median project is overdue by 4 years.

More detailed examination of the 43 projects whose original completion dates were disclosed to the PTFP provides a better insight into the typical project delay and the amount of money that has already been paid to the contractors responsible for these projects. As shown in Table 2 below, by the time a project is 40% complete, nearly 70% of the total contract value has already been paid over to the contractor. And by the time a project is close to completion, it is typically 5 years overdue.

**Table 2: Examination of PHCN Transmission Projects (by “percentage of project completed”)**

| % of Project Completed | No. of Projects | Payments as % of Project Cost (Avg) | Years Overdue (Avg) |
|------------------------|-----------------|-------------------------------------|---------------------|
| 0-20                   | 12              | 45%                                 | 1.8                 |
| 21-40                  | 8               | 69%                                 | 2.2                 |
| 41-60                  | 6               | 75%                                 | 3.8                 |
| 61-80                  | 7               | 67%                                 | 5.0                 |
| 81-100                 | 10              | 92%                                 | 5.0                 |

**Methodological Note:**

The data made available to the PTFP (for both PHCN and NIPP projects) displays the total project cost; contract values; variation orders etc in a variety of different currencies. For the purposes of the analysis contained throughout this chapter, all amounts expressed in foreign currencies have been conformed to USD equivalent values using the following conversion rates: USD 1.00 to NGN 150.00; USD 1.37 to Eur 1.00; and USD 1.66 to GBP 1.00. These conversion rates have been applied irrespective of the dates on which the contracts were awarded or the dates on which actual payments were made.

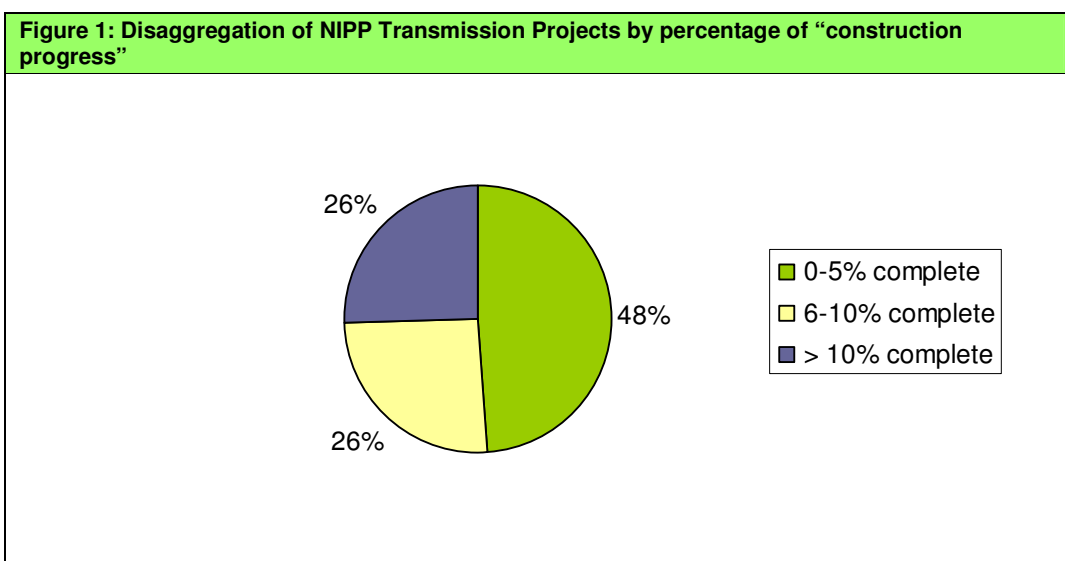
The application of this rule of thumb reflects the particular focus of the PTFP. The object of the PTFP’s analysis of the transmission projects managed by PHCN and the NIPP is not to effect a detailed financial audit. Instead, the much more modest purpose of the PTFP’s analysis is simply to enable the PACP to obtain a clear, comprehensible, and “high level” overview of all the transmission projects – so that priorities can be better established in the light thereof.

## **1.2 Overview of Outstanding NIPP Transmission Projects**

In July 2010, the PTFP was provided with a list of outstanding transmission projects under the management of the NIPP. The list consisted of 43 projects in total. In each case, the identity of the contractors and the contract values were clearly specified.

| Table 3: Summary of NIPP Transmission Projects |    |                                      |                                   |                        |                                    |                                |
|------------------------------------------------|----|--------------------------------------|-----------------------------------|------------------------|------------------------------------|--------------------------------|
| Contractor(s)                                  |    | Total Project Cost in USD Equivalent | Avg Project Cost (USD Equivalent) | Years Overdue (Median) | Avg % of Project Cost Already Paid | Avg % of Construction Progress |
| Clearly specified                              | 39 | 1,210,168,246                        | 28,143,448                        | NA                     | NA                                 | 19%                            |
| Clearly specified                              | 4  | NA                                   | NA                                | NA                     | NA                                 | 0%                             |

This list provided to the PTFP also included information with regard to “construction progress” (expressed in percentage terms). As shown in Figure 1 below, as at July 2010, three quarters of all the NIPP transmission projects had a “construction progress” indicator of 10% or less.



As at July 2010, the PTFP was still awaiting data in respect of: a) payments made to date; and b) original completion dates.

### 1.3 Overview of All Contractors (both PHCN and NIPP)

As indicated above, from the total of 113 projects across the two lists presented to the PTFP (covering both PHCN and NIPP projects), the identities of the contractors were clearly specified for 96 of the projects. As shown in Table 4 below, these 96 projects were spread across a total of 57 “contracting groups”.

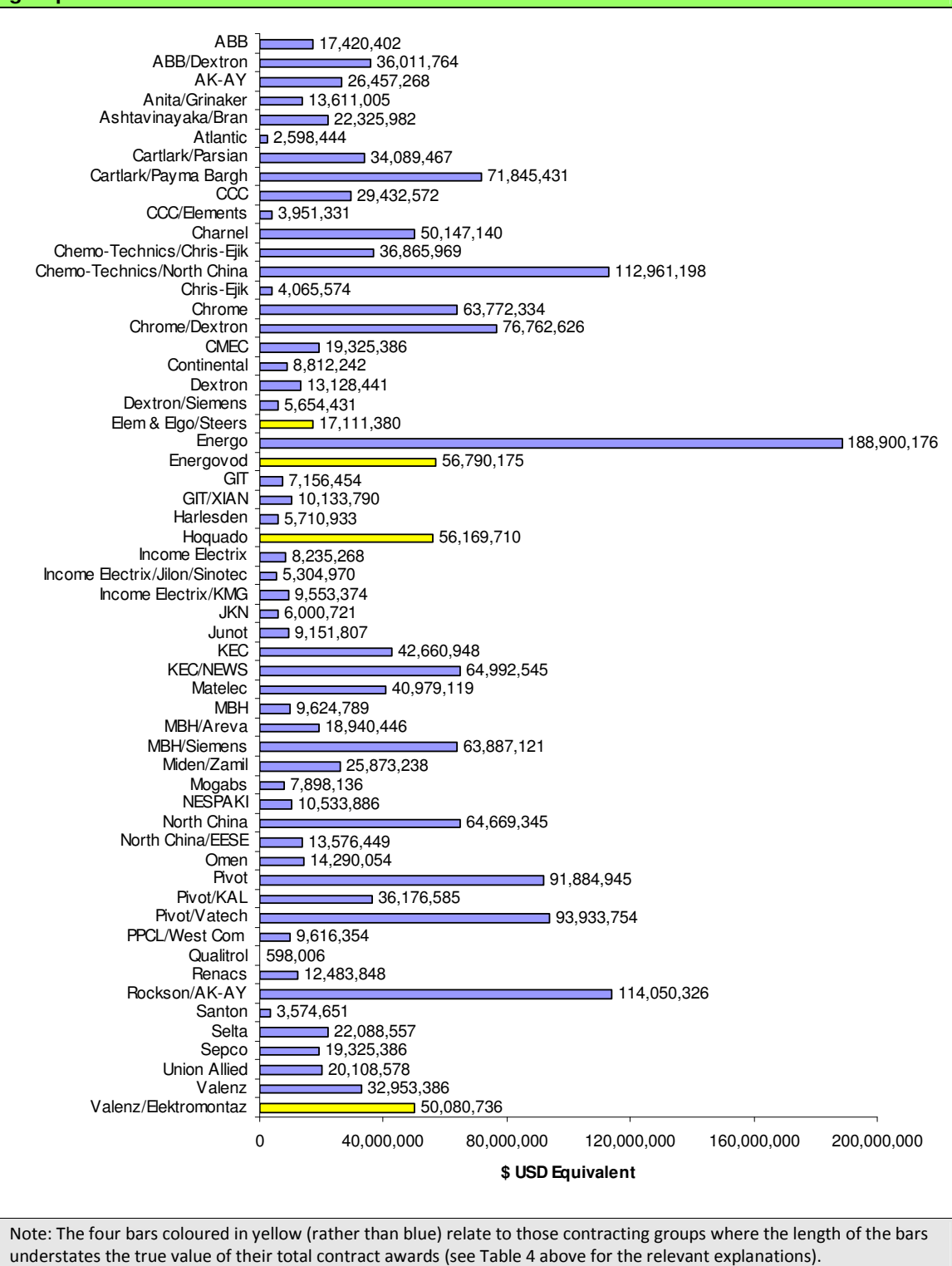
| Table 4: Tabular Overview of all Contractors (both PHCN and NIPP) |                                      |                 |      |       |       |
|-------------------------------------------------------------------|--------------------------------------|-----------------|------|-------|-------|
| Contractor-Short                                                  | Total Project Cost in USD Equivalent | No. of Projects |      | Total | Notes |
|                                                                   |                                      | PHCN            | NIPP |       |       |
| ABB                                                               | 17,420,402                           | 2               |      | 2     |       |
| ABB/Dextron                                                       | 36,011,764                           | 1               |      | 1     |       |
| AK-AY                                                             | 26,457,268                           |                 | 1    | 1     |       |
| Anita/Grinaker                                                    | 13,611,005                           |                 | 1    | 1     |       |
| Ashtavinayaka/Bran                                                | 22,325,982                           | 2               |      | 2     |       |
| Atlantic                                                          | 2,598,444                            | 1               |      | 1     |       |
| Cartlark/Parsian                                                  | 34,089,467                           | 1               | 1    | 2     |       |
| Cartlark/Payma Bargh                                              | 71,845,431                           | 2               | 1    | 3     |       |

| Table 4: Tabular Overview of all Contractors (both PHCN and NIPP) |                                      |                 |      |       |                                                                                                    |
|-------------------------------------------------------------------|--------------------------------------|-----------------|------|-------|----------------------------------------------------------------------------------------------------|
| Contractor-Short                                                  | Total Project Cost in USD Equivalent | No. of Projects |      | Total | Notes                                                                                              |
|                                                                   |                                      | PHCN            | NIPP |       |                                                                                                    |
| CCC                                                               | 29,432,572                           |                 | 1    | 1     |                                                                                                    |
| CCC/Elements                                                      | 3,951,331                            | 1               |      | 1     |                                                                                                    |
| Charnel                                                           | 50,147,140                           | 1               | 2    | 3     |                                                                                                    |
| Chemo-Technics/Chris-Ejik                                         | 36,865,969                           |                 | 1    | 1     |                                                                                                    |
| Chemo-Technics/North China                                        | 112,961,198                          |                 | 1    | 1     |                                                                                                    |
| Chris-Ejik                                                        | 4,065,574                            |                 | 1    | 1     |                                                                                                    |
| Chrome                                                            | 63,772,334                           |                 | 1    | 1     |                                                                                                    |
| Chrome/Dextron                                                    | 76,762,626                           | 1               |      | 1     |                                                                                                    |
| CMEC                                                              | 19,325,386                           |                 | 1    | 1     |                                                                                                    |
| Continental                                                       | 8,812,242                            | 2               |      | 2     |                                                                                                    |
| Dextron                                                           | 13,128,441                           | 1               | 3    | 4     |                                                                                                    |
| Dextron/Siemens                                                   | 5,654,431                            | 1               |      | 1     |                                                                                                    |
| Elem & Elgo/Steers                                                | 17,111,380                           | 1               | 3    | 4     | The “total” project cost understates the true value because it only covers 3 out of the 4 projects |
| Energovod                                                         | 56,790,175                           |                 | 3    | 3     | The “total” project cost understates the true value because it only covers 2 out of the 3 projects |
| GIT                                                               | 7,156,454                            | 1               |      | 1     |                                                                                                    |
| GIT/XIAN                                                          | 10,133,790                           | 1               |      | 1     |                                                                                                    |
| Harlesden                                                         | 5,710,933                            | 1               |      | 1     |                                                                                                    |
| Hoquado                                                           | 56,169,710                           |                 | 2    | 2     | The “total” project cost understates the true value because it only covers 1 out of the 2 projects |
| Income Electrix                                                   | 8,235,268                            | 1               |      | 1     |                                                                                                    |
| Income Electrix/Jilon/Sinotec                                     | 5,304,970                            | 1               |      | 1     |                                                                                                    |
| Income Electrix/KMG                                               | 9,553,374                            | 1               |      | 1     |                                                                                                    |
| JKN                                                               | 6,000,721                            | 1               |      | 1     |                                                                                                    |
| Junot                                                             | 9,151,807                            | 1               |      | 1     |                                                                                                    |
| KEC                                                               | 42,660,948                           | 1               |      | 1     |                                                                                                    |
| KEC/NEWS                                                          | 64,992,545                           | 1               | 2    | 3     |                                                                                                    |
| Matelec                                                           | 40,979,119                           | 1               | 1    | 2     |                                                                                                    |
| MBH                                                               | 9,624,789                            |                 | 2    | 2     |                                                                                                    |
| MBH/Areva                                                         | 18,940,446                           | 1               |      | 1     |                                                                                                    |
| MBH/Siemens                                                       | 63,887,121                           | 2               |      | 2     |                                                                                                    |
| Miden/Zamil                                                       | 25,873,238                           |                 | 1    | 1     |                                                                                                    |
| Mogabs                                                            | 7,898,136                            | 2               |      | 2     |                                                                                                    |
| NESPAKI                                                           | 10,533,886                           | 1               |      | 1     |                                                                                                    |
| North China                                                       | 64,669,345                           | 2               | 1    | 3     |                                                                                                    |
| North China/EESE                                                  | 13,576,449                           | 1               |      | 1     |                                                                                                    |
| Omen                                                              | 14,290,054                           | 2               |      | 2     |                                                                                                    |
| Pivot                                                             | 91,884,945                           | 2               | 1    | 3     |                                                                                                    |
| Pivot/KAL                                                         | 36,176,585                           |                 | 1    | 1     |                                                                                                    |
| Pivot/Vatech                                                      | 93,933,754                           |                 | 1    | 1     |                                                                                                    |
| PPCL/West Com                                                     | 9,616,354                            | 1               |      | 1     |                                                                                                    |
| Qualitrol                                                         | 598,006                              | 1               |      | 1     |                                                                                                    |
| Renacs                                                            | 12,483,848                           |                 | 2    | 2     |                                                                                                    |
| Rockson/AK-AY                                                     | 114,050,326                          |                 | 1    | 1     |                                                                                                    |
| Santon                                                            | 3,574,651                            | 1               |      | 1     |                                                                                                    |
| Selta                                                             | 22,088,557                           |                 | 1    | 1     |                                                                                                    |

| Table 4: Tabular Overview of all Contractors (both PHCN and NIPP) |                                      |                 |      |       |                                                                                                    |
|-------------------------------------------------------------------|--------------------------------------|-----------------|------|-------|----------------------------------------------------------------------------------------------------|
| Contractor-Short                                                  | Total Project Cost in USD Equivalent | No. of Projects |      | Total | Notes                                                                                              |
|                                                                   |                                      | PHCN            | NIPP |       |                                                                                                    |
| Sepco                                                             | 19,325,386                           |                 | 1    | 1     |                                                                                                    |
| Union Allied                                                      | 20,108,578                           | 3               |      | 3     |                                                                                                    |
| Valenz                                                            | 32,953,386                           | 4               |      | 4     |                                                                                                    |
| Valenz/Elektromontaz                                              | 50,080,736                           | 1               | 3    | 4     | The “total” project cost understates the true value because it only covers 3 out of the 4 projects |
| Total                                                             | 1,914,258,956                        | 53              | 43   | 96    |                                                                                                    |

The aggregate project cost data presented in Table 4 above is reproduced in graphical format in the chart below.

**Figure 2: Total value of outstanding contracts (both PHCN and NIPP) awarded – by contracting group.**



## 2.0 Short Term Priorities

### 2.1 Current Evacuation Capacity and the Targeted Increase by April 2011

As at August 2010, the peak generation evacuated by the national grid was 3,804 MW. A flow diagram representing the evacuation of this power is shown in Figure 1 below.

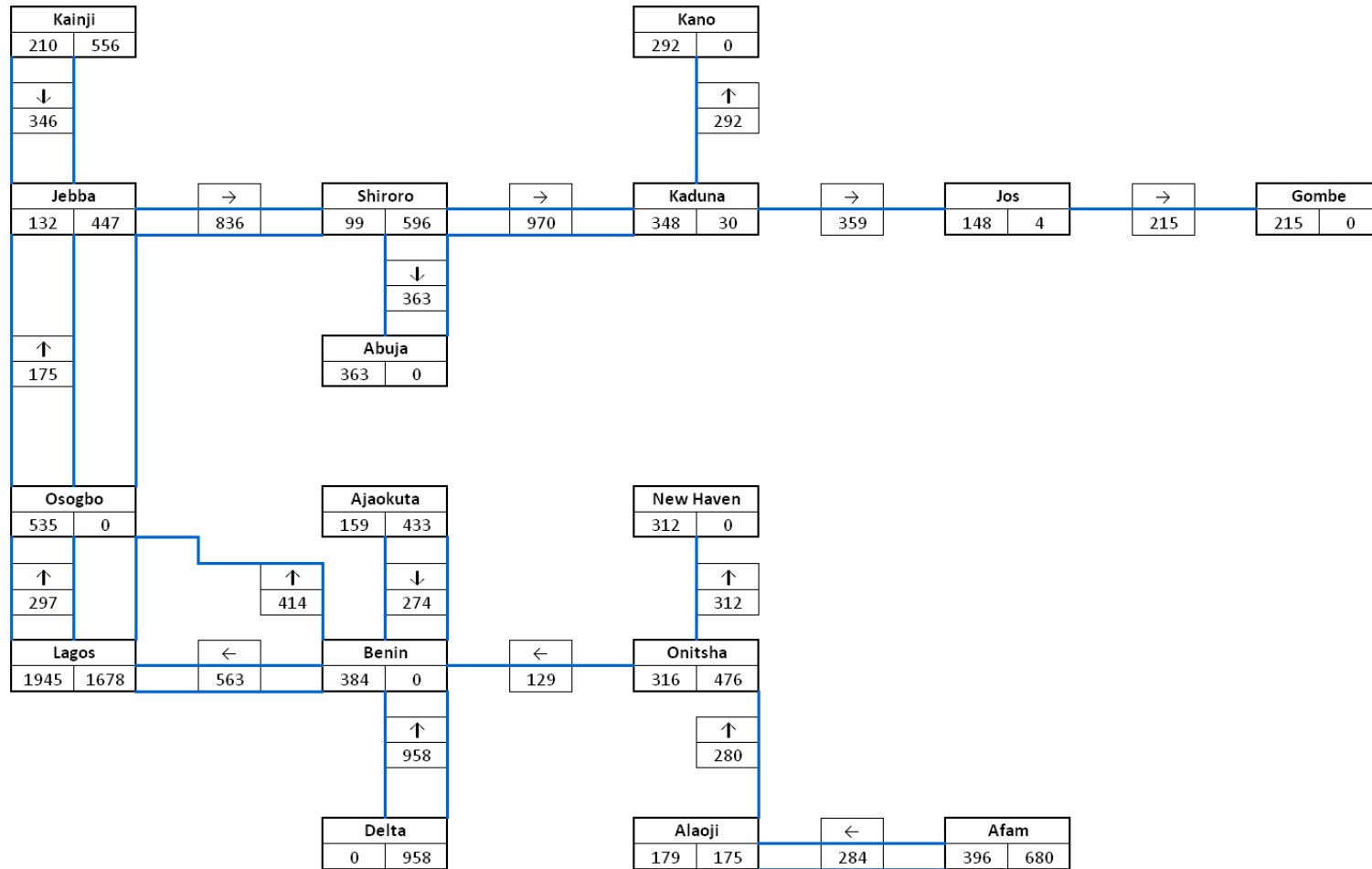
It is important to note that evacuation capacity has three major components:

- Available transformer capacity (both transmission voltages);
- Transmission line capacity (thermal rating);
- Ancillary facilities – voltage and frequency support.

At present, the principal bottleneck is 330/132kV transformation. As at July 2010, the total transformation capacity of the 330kV network was 5,155 MW equivalent. However, given the imbalance between the distribution of transformers around the country and the distribution of required customer loads, it is inevitable that some transformers will be fully loaded whilst other are lightly loaded. Moreover the nominal transformer capacity includes transformers that are on long term outage for various reasons that include the requirement for major repair or complete replacement because they have been inappropriately configured. Hence, the numerical sum of transformer capacities represents a higher figure than the “true deliverable” transformation capacity, which was at a limit of circa 4,500 MW equivalent as at July 2010.

Moving forward, the Government is targeting an increase in annual average generation from 3,825 MW in July 2010 to circa 5,755 MW in April 2011. To ensure that this increase in generating capacity is not left stranded for lack of evacuation capacity, there would be a need for a 30% increase in the “true deliverable” transformation capacity of the country’s 330kV network between July 2010 and April 2011 from its current limit of circa 4,500 MW equivalent. In practice, however, it is highly unlikely that an increase of this magnitude will be realisable by April 2011.

Instead, the Government’s projected targets for April 2011 are that the “true deliverable” transformation capacity will rise by just over 10% to about 5,000 MW equivalent (even though the total nominal 330kV transformation capacity is projected to rise to 5,995 MW equivalent).

**Figure 1: Load flow as at August 2008 (3,800 MW)**

## 2.2 Critical Short Term Projects

In the short term (i.e. the period leading up to April 2011), there are three critical areas which need to be addressed, namely:

- Improving **transformation** between 330kV and 132kV, in particular at:
  - Lagos: A 150MVA transformer is being commissioned and a 300MVA transformer is planned. But more will be needed.
  - Abuja (Katampe): A 150MVA transformer is planned.
  - Jos: A 150MVA transformer is planned.
  - Kaduna: A 150MVA transformer is planned.
  - Benin: At least one 150MVA transformer is needed *but is not yet in the current plan*.
  - Afam: One 150MVA transformer is needed *but is not yet in the in current plan*. Thereafter additional transformers will be needed at Afam/Alaoji.
- Improving **132kV transmission** in the southeast delta. At Afam and Alaoji, the circuits are already overloaded at 3,800MW of generation so the additional transformers required will not deliver any benefit without additional 132kV circuits.
- Installing **132kV capacitor banks** in the north at Kano, Gombe, Jos and Kaduna.

Once these actions have been fully effected, the current 330kV system should comfortably meet the April 2011 target for the evacuation of up to 5,000 MW of generation but the maximum limit is unlikely to exceed 6,000 MW.

## 2.3 Load Shedding Strategies

At present, the available generation is allocated to load centres on a daily basis and the System Operator tries to ensure that each zone keeps to their allocated load. On days when the available generation is below circa 2,700MW, the System Operator divides the country into two zones within which it rotates power twelve hourly. However, due to the strategic nature of Lagos (economically) and Abuja (politically), the System Operator always seeks to allocate these two cities twenty-four hours of supply although the distribution companies still have to engage in their local load shedding. Moreover, in periods when generation is above 2,700MW and, in particular, when it rises above 3,000MW, the directive from the National Control Centre (NCC) is that every load centre should take as much power as they can.

The PTFP is currently examining ways in which these load shedding practices can be improved to make power supply to consumers less unpredictable. The first step in this exercise involves the detailed assessment of the actual load distribution capability of the distribution companies. Once this assessment is complete, the NCC will be encouraged to allocate load based on the new realities.

The aim is to achieve this objective within the next twelve months. Critical to this task, however, is the completion of the on-going SCADA/EMS project. The commissioning of this

vital load management and control system will enable the NCC and the System Operator to do more automatic load shedding which, in turn, will make electricity supply more predictable.

### 3.0 Medium Term Priorities

#### 3.1 Targeted Increase in Evacuation Capacity by December 2013

In order to deliver a generation output beyond 6,000MW to customers, the 330kV transmission system circuits must be increased. The order of priority of the current projects is:

- **Afam to Jos (the southeast to north corridor):** Apart from the ongoing benefits of creating a real transmission system mentioned below, this is vital for the evacuation of the gas generation projects in the southeast delta (NIPP project).
- **Onitsha to Benin (the east to west corridor):** Currently there is just a single circuit connection here. There are two projects which cross the Niger River connecting the south-east gas generation to Lagos. The first of these transmission lines is a new single circuit whereas the second line is a new double circuit. Both of these are beneficial in the short to medium term and vital in the long term.
- **Alaoji-Warri-Onitsha double circuit (the east to west corridor):** Currently, there is just a single circuit on this route. But if this route is not reinforced before or at the same time as the strengthening of the lines crossing the Niger River, it will become the bottleneck out of the southeast. Progress, to date, on this project has been slow and urgent action is required. The PTFP is currently examining the available options.

The impact these three projects will have on the evacuation capacity of the grid is shown in Figures 2 and 3 which indicate, additively, the impact of:

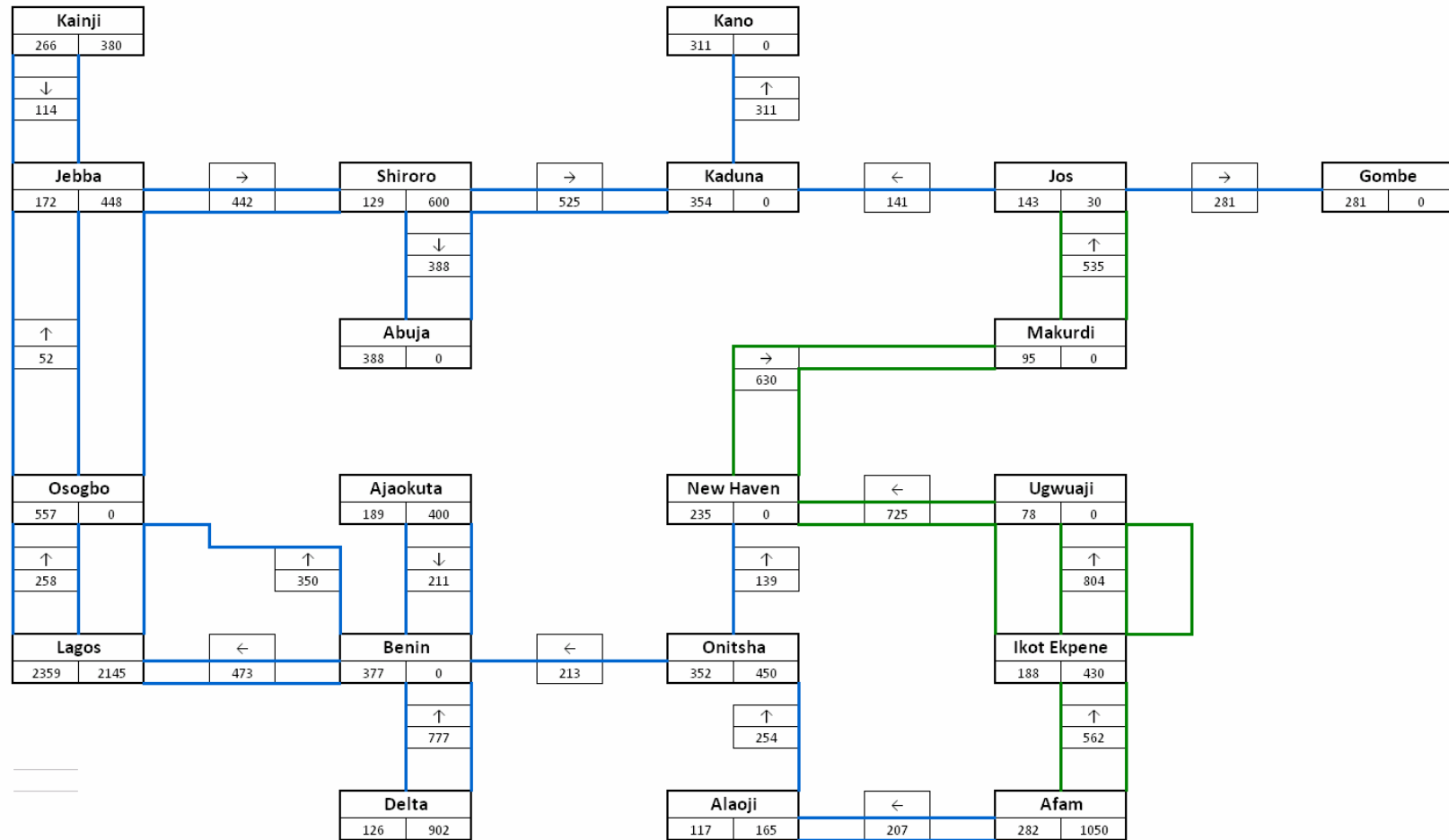
- a) the completion of the Afam to Jos circuits which should increase the transmission capacity to circa 7,500 MW equivalent or possibly more; and
- b) the subsequent addition of the Onitsha to Benin circuits and the Alaoji-Warri-Onitsha circuits (plus the NIPP connection between Ajaokuta and Abuja) all of which should take the transmission capacity up beyond 8,500 MW.

However, although these are the *main three projects*, other auxiliary projects will also need to be completed in the coming three years. These include the following.

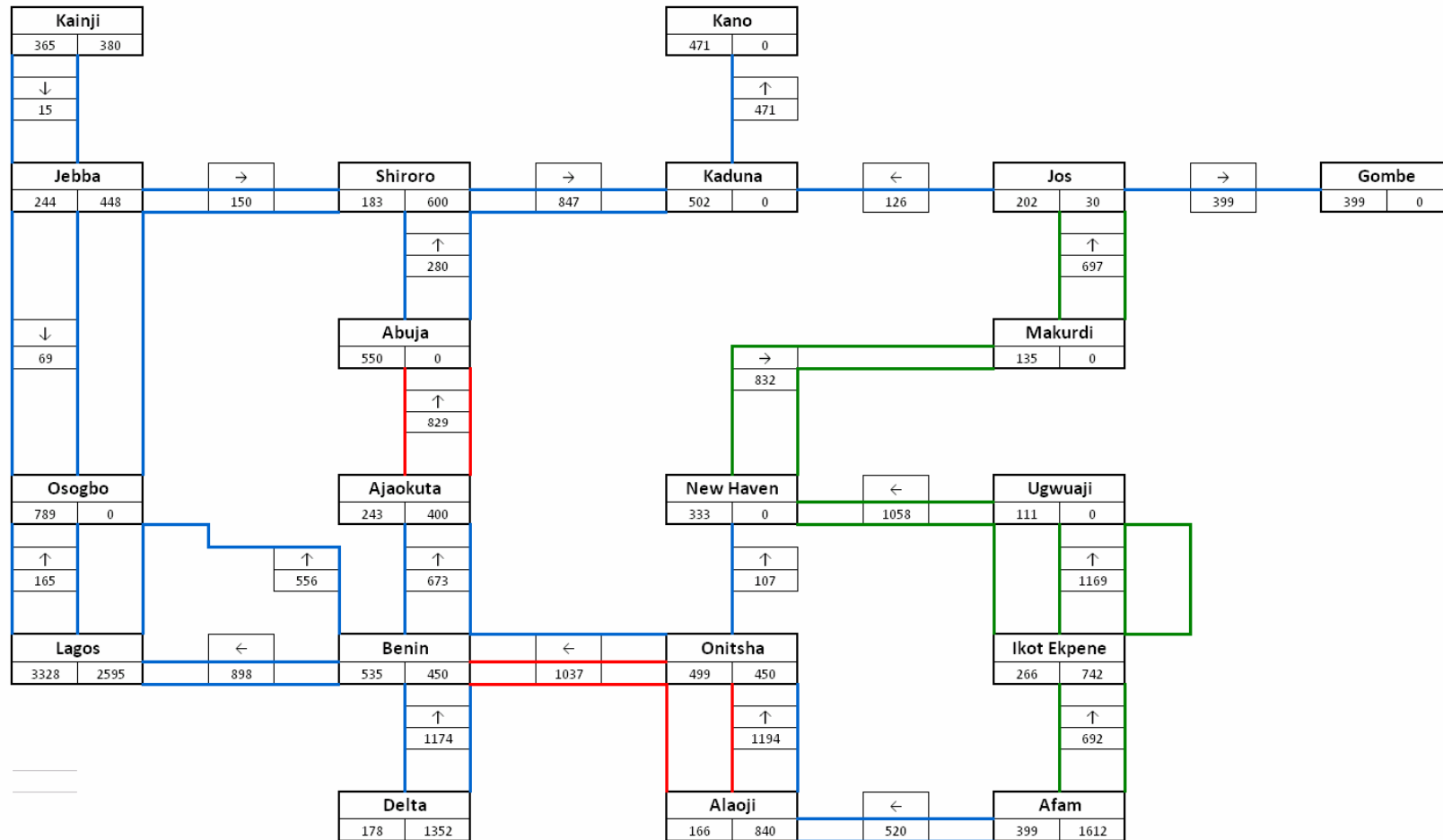
- 2nd Benin-Osogbo 330kV Line;
- 2nd Kaduna-Kano 330kV Line (*this line is not in this year's budget*);
- 2nd Kaduna-Jos 330kV Line;
- Static Var Compensator (SVC)/Capacitor Bank in Gombe and Kano for voltage stability;

- Katampe-National Stadium 132kV line and associated Substation at National Stadium;
- Rehabilitation/re-conductoring of the following identified 132kV circuits:
  - Otta-Papalanto
  - Afam-Port Harcourt
  - Aba-Itu-Calabar
  - Itu-Uyo-Eket
  - Ajaokuta-Irrua
  - Ayede-Shagamu
  - Ayede-Iwo-Iseyin.
- 2nd Reactors in Benin and Osogbo;
- Outsourcing of line trace of critical lines (*TCN has been requested to bring up modalities*);
- Replacement of all missing sky wire segments;
- Deployment of multi-stage Under Frequency relays;
- Operationalizing the Grid Code.

In summary, the completion of all the priority projects outlined (the budgets for which have – to a large extent – already been provided) should ensure that the transmission and transformation capacity of the national grid increases to more than 8,500 MW equivalent by the end of 2013.

**Figure 2: Projected load flow of circa 7,000 MW with the completion of the Afam to Jos circuits**

**Figure 3: Projected load flow in excess of 8,500 MW (up to a maximum of circa 10,000 MW) with the completion of the Afam to Jos circuits plus the subsequent addition of the Onitsha to Benin circuits and the Alaoji-Warri-Onitsha circuits and the NIPP connection between Ajaokuta and Abuja**



### 3.2 Grid Integrity and Reliability

Other objectives which need to be actively pursued in the medium term include:

- **Establishing proper line trace:** Standard clearances are to be re-established under and by both sides of all transmission lines. This is to free the lines from vegetation and other related encumbrances.
- **Replacing defective sub-station terminal equipment** such as isolators, circuit breakers, CTs and VTs.
- **Establishing proper relay coordination:** Many relays in the system have ceased to function properly and need to be recalibrated and re-coordinated with the new realities on the grid.
- **Enforcement of grid discipline:** The System Operator (SO) is the custodian and manager of the Grid Code and enforcer of its provisions. However, the SO has not been adequately empowered to do so by TCN within which it is presently embedded. Numerous violations of the SO's instructions occur on a daily basis and the SO, at present, is largely unable to do anything about this.

It is also important to note that the completion of the Afam to Jos transmission circuits (described in the previous section) is of critical importance not just to the expansion of the grid's capacity but to its stability and reliability. Thus, over the coming 12 months, the Presidential Task Force on Power will pay **particular attention** to these circuits because:

- The completion of these transmission circuits will create an Interconnected Transmission Network instead of a Radial Network – thereby providing much greater system stability and reducing the incidences in which a whole region is blacked out because of a collapse of a single circuit
- In the process, this will allow more power to flow into Lagos from Kainji, Jebba and Shiroro. In other words: by delivering more power to the North, the completion of the Afam to Jos circuits will, indirectly, also deliver more power to the South. In colloquial terms, this is what is commonly known as a “win-win option”.
- There will also be substantial improvement in the voltage profile in the north-eastern axis of the grid.

One of the simplest and most effective ways by which the Presidency can ensure that work on this vital “Northern Route” is completed within the next 18 months is to make sure that all the contractors working on this project are subject to a high level of public scrutiny and visibility.

### 3.3 Power Quality and System Stability

#### 3.3.1 The return of Kainji to frequency responsive mode

At the moment there is no automatic frequency response in Nigeria. This leads to wide fluctuations in the system frequency (which is experienced by all power stations and all consumers connected to the Grid). System frequency in Nigeria is wide, often between 48.5Hz and 51.5Hz (despite the statutory limits being 49.75Hz to 50.25Hz). The consequences at the generation level are that machines at Geregu, Okpai and Kainji will trip on high frequency (as it gets towards 52Hz) and this leads to higher maintenance on the machines and then a large fall in system frequency once the machines have tripped. Large variation in the system frequency also leads to total system collapses and, as a consequence, unpredictable and long interruption of supply to customers.

To return Kainji to frequency responsive mode requires a major overhauling of Kainji (a process which is already being managed and funded by the World Bank and the KfW Bankengruppe). With a dedicated focus from the Presidency, the work could be completed within 18 months.

The return of Kainji to frequency responsive mode will provide a much needed increase in grid stability and will allow the quality of electricity received by the end user to be significantly improved.

In addition, having Kainji in frequency mode would increase the sale value of other PHCN power plants and increase the returns (and decrease the risks) to private sector investors wishing to make investments in both power generation and power distribution.

#### 3.3.2 Installation of Reactors, Capacitors and Static Voltage Compensators

Voltages across the power system vary, tending to be high in areas near generation and low in areas far from generation. In addition, during periods of low overall system load (e.g. night times) voltages are high and during high load times (daytime peaks) voltages are low.

In order to operate the system efficiently, to avoid the effects of under and over voltage in delivery to customers, and most importantly to avoid voltage stability problems and voltage collapse, it is necessary to use equipment to locally improve the voltage.

Reactors are most beneficial if connected at higher voltages hence should be connected at 330kV. Capacitors are most beneficial if connected at lower voltages; however if connected on the distribution system world wide experience is that distribution companies do not switch them out during low load periods exacerbating the high voltage problems, hence it is best to connect them at 132kV.

Thus, in the southwest of the country, particularly around Osogbo, voltages are high and **reactors** are required to reduce the voltage. In the longer run, as we increase generation in the southeast delta, Onitsha, Benin and New Haven will also require them.

By contrast, in the north (Kano, Kaduna, Jos, Gombe etc), **capacitors** are necessary to increase the voltage.

In addition to the appropriate and targeted deployment of reactors and capacitors, there may be a need for some limited deployment of **static voltage compensators (SVCs)**, particularly where voltages are low. These devices contain reactors and capacitors that are actively electronically controlled to increase or decrease the voltage as necessary. *SVCs cost about three times more than reactors or capacitors. Hence if the problem is just about high or low voltage reactors or capacitors should be applied first.* Nevertheless, there are certain areas (e.g. Kano) where there is clearly a case for installing an SVC alongside new capacitors.

### 3.3.3 Resuscitating the use of a Shiroro as a synchronous compensator

A synchronous compensator is a generator that is running in a mode where it absorbs power from the grid in order to rotate (i.e. it does not generate power). However it acts to increase or decrease the system voltage. Shiroro is designed with this capability, but this capability has never been knowingly deployed. The recovery and use of this capacity would be beneficial to the network as a whole; and an education and implementation project should therefore be developed and implemented so that during the dry season Shiroro can continue to support northern voltages.

### 3.3.3 Installation of multi stage under frequency relays

On a system with massive power shortage it is practically impossible to carry sufficient reserve. Hence, in order to minimise system collapses, it is necessary that an efficient system of automated load tripping occurs as the frequency drops after the instantaneous loss of a generator. All power systems have these in place as a cover for an extremely unlikely emergency. However, in Nigeria – given the fact that, at present, 20 partial or total system collapses occur each year – this is a necessary operational tool that would reduce the number of system collapses to *one quarter* of their current level and do so at a medium cost level (i.e. the benefits far outweigh the costs).

### 3.3.4 Commissioning of the new NCC and operationalising the Regional Control Centres

It is vital that the work of the System Operator is adequately resourced. Additional generation and transmission capacity is of little use unless the System Operator has the capacity to manage the load flow and minimise outages and voltage/frequency fluctuations.

Moreover, it is vital that the System Operator's data is able to effectively interface with the data from the Market Operator. Because if the System Operator can't be trusted to allocate loads in accordance with contracts, the private sector will not be willing to invest.

Hence, amongst other things, the rehabilitation and upgrading of the National Control Centre is a vital priority and needs to be resourced accordingly. More specifically, the SCADA system has many data and control connection problems on the TCN side of the project interface boundary (e.g. defective meters and control connections). These must be corrected in order for the SCADA system to be actually usable.

The 2010 Budget allocates just under 17m USD for capital projects to be undertaken at the System Operator. However, a case can be made that the rehabilitation and upgrading of the System Operator is far more important than some of the more expensive capital projects which are included in the 2010 Budget. If PHCN needs to spend more money to make sure all the necessary work is completed within the next 18 months instead of the next 36 months, the return on this investment will be tremendous. Moreover, this undertaking would provide additional (and much needed) assurance to private sector investors wishing to make investments in both power generation and power distribution.

### **3.4 The ring fencing of activities of core TCN sectors**

As already noted, it is the Government's intention that the management of TCN should be granted to a private sector company under a five year management contract. However, both before and after this transition, there is an important governance issue which needs to be addressed.

More particularly, the System Operator (SO) and the Market Operator (MO) perform distinct functions and have responsibilities that transcend those of the Transmission Service Provider (TSP). They need to be allowed to perform these functions without any hindrance.

Though the terms and conditions of the TCN license provide for the financial ring-fencing for the operations of the TSP, SO and MO respectively, this provision is inconsistent with the provisions of MYTO, which financially ring-fenced the MO but lumped together the finances of TSP and SO. A Committee established by NERC to look into these inconsistencies recommended that 21% of funds provided for TCN should be allocated to the SO to ring-fence it financially. NERC has already noted this as one of the items to be addressed in the major review of MYTO.

## **4.0 Long Term Priorities**

As with all other parts of the electricity supply chain, huge investments will be required in the grid infrastructure over the next ten to twenty years. It is all the more imperative, therefore, that these new investments are pushed forward as rapidly as possible. To that end, the Federal Government plans to build a new super transmission network which will enable the grid to wheel power up to the requirements that will meet Nigeria's power needs for Vision 2020. Amongst other things, this supergrid will help to evacuate power from the proposed Mambilla hydro power plant. The procurement of designers for this network will shortly commence.

It should also be noted that the long-term expansion of the grid infrastructure is an activity which is critically dependent upon the revenues which ultimately stem from the end-consumers. To that end, the Government's commitment to the introduction of a genuinely cost-reflective tariff will ensure that a substantial portion of the requisite capital investments will be recovered through the revenues generated by the electricity market itself i.e. by the Transmission Use of System (TUOS) charges paid to the Transmission Company of Nigerian (TCN).

Moreover, in view of the fact that the timely provision of long-term and cost-effective financing for grid stability and expansion is critical, the PACP has approved the establishment of a Transmission Network Development Fund. This Fund is now being established as an infrastructure fund (regulated by the Securities and Exchange Commission) that will gather long-term financing from the private and public sectors solely for the purpose of investing in TCN's high voltage transmission grid construction projects and will be repaid directly from the TUOS charges.

## Ch.6 – Distribution

### 1.0 Introduction

In the run-up to the privatisation of the distribution companies, the Federal Government will be working hard to enhance the operational and commercial performance of the distribution companies. Not only will these efforts improve the quality of service experienced by electricity customers, they will also enhance the value of the distribution companies and the prices which the government is able to realise upon their divestiture.

In this context, it is important to emphasise that the Government's actions in this sector is based upon rigorous information gathering, validation and assessment. More particularly, over the past two months, the Presidential Task Force on Power has been working with the staff of the various distribution companies to establish (to within a 10% margin of error) both the operational and commercial capabilities of each of the eleven distribution zones. This exercise has enabled them to *clearly* establish (for the first time in the history of the Nigerian Electricity Industry) the gap between the existing and the required capabilities. It has also enabled them to *prioritise* their activities and lay out the programme by which they intend to reduce the capability gaps during the short period of transition that will precede the privatisation of the unbundled distribution companies.

As a fall out from this exercise, a full compilation of projects to close the identified gaps has been developed and this will serve as a guide and reference for future capital budgeting and for the due diligence that will be undertaken during the privatisation transactions.

## 2.0 Short Term Priorities

### 2.1 The short term operational targets

The status mapping exercise described above has allowed the Government to focus its project planning and budgeting on those activities which are likely to generate the greatest short-term (i.e. pre-privatisation) improvements in service delivery.

As indicated in Table 1 below, the analysis conducted by the Task Force indicate that the total peak load on the entire distribution network is currently just over 9,057 MW, while the current total capability is 5,758 MW, giving a total distribution gap of about 3,000 MW.

Faced with the gaps outlined in this table, the Government's short term targets are:

- To close circa 30% of the identified gaps by April 2011. This will increase total distribution capability from 5,758 MW equivalent to circa 6,900 MW equivalent. However, it is important to note that despite this increase in capacity, the total amount of electricity delivered to customers cannot exceed the "true deliverable" transformation capacity of the transmission network, which (as described in the previous section) is unlikely to exceed 5,000 MW equivalent by April 2011.
- To reduce aggregate distribution losses (technical and non-technical) by at least 5% by April 2011;
- To secure a noticeable increase in the average number of hours of electricity supplied to consumers by at least 10% by April 2011.

| Table 1: Capability gap analysis for all eleven distribution companies |                                          |                              |                       |                       |                     |                      |
|------------------------------------------------------------------------|------------------------------------------|------------------------------|-----------------------|-----------------------|---------------------|----------------------|
| ESTABLISHING THE GAP                                                   |                                          |                              |                       |                       | CLOSING THE GAP     |                      |
| DISCO                                                                  | STATES/AREAS COVERED                     | DISTRIBUTION CAPABILITY (MW) | PEAK LOAD DEMAND (MW) | DISTRIBUTION GAP (MW) | SHORT TERM GAP (MW) | MEDIUM TERM GAP (MW) |
| ABUJA                                                                  | FCT, Nassarawa, Niger, Kogi              | 515                          | 835                   | 320                   | 106                 | 214                  |
| BENIN                                                                  | Edo, Delta, Ondo, Ekiti                  | 392                          | 1000                  | 608                   | 202                 | 406                  |
| EKO                                                                    | Lagos South                              | 796                          | 1105                  | 309                   | 103                 | 206                  |
| ENUGU                                                                  | Anambra, Enugu, Abia, Imo, Ebonyi        | 612                          | 1017                  | 405                   | 135                 | 270                  |
| IBADAN                                                                 | Oyo, Ogun, Osun, Kwara                   | 878                          | 1193                  | 315                   | 105                 | 210                  |
| IKEJA                                                                  | Lagos North                              | 854                          | 1335                  | 487                   | 162                 | 325                  |
| JOS                                                                    | Plateau, Bauchi, Gombe, Benue            | 378                          | 507                   | 129                   | 43                  | 86                   |
| KADUNA                                                                 | Kaduna, Kebbi, Sokoto, Zamfara           | 344                          | 520                   | 176                   | 59                  | 117                  |
| KANO                                                                   | Kano, Jigawa, Katsina                    | 365                          | 596                   | 231                   | 77                  | 154                  |
| PORT HARCOURT                                                          | Cross Rivers, Akwa Ibom, Rivers, Bayelsa | 486                          | 773                   | 287                   | 96                  | 191                  |
| YOLA                                                                   | Adamawa, Taraba, Bornu, Yobe             | 138                          | 176                   | 38                    | 13                  | 25                   |
| <b>TOTAL</b>                                                           |                                          | <b>5758</b>                  | <b>9057</b>           | <b>3305</b>           | <b>1101</b>         | <b>2204</b>          |

To a large extent, the achievement of the targets shown in Table 1 above will be made possible through the completion of the on-going NIPP and PHCN projects, the budgets for which have already been provided. Nevertheless, there are a number of new projects which need to be funded in order to secure the delivery of the Government's short term targets and these are currently being identified by the Presidential Task Force on Power.

It is important to note, however, that rigorous prioritisation is required in order to achieve the targets within the specified timeframes. The distribution companies cannot and should not jump from one unfinished project to another. More importantly, they are keenly aware that the principle of "comprehensive restoration" needs to be applied.

This principle entails addressing not only the primary problem (or the reason for the gap) but also investigating and addressing the cause of the primary problem, as well as the impact of the primary solution. The idea of comprehensive restoration is for the consumers affected by the primary problem to have all the relevant levels of the distribution network delivering constant supply availability as soon as the solution to the primary problem is achieved.

In layman's terms, this means, for example, that there is little point in trying to install a whole array of transformers in places where there are capacity constraints further up the transmission chain without corresponding plans to deal with these bottlenecks.

Bearing these principles in mind, the distribution companies working with the Presidential Task Force on Power have identified the projects, on a zone by zone basis, which will help to close the capability gaps in both the short and medium term. The full list of these projects can be found at the end of this chapter.

## **2.2 The short term commercial targets**

At present, the average monthly revenue collection capability of the Nigerian Electricity Market is Ten Billion Naira (N10bn), while the average basic monthly obligation of the Market is Fifteen Billion Naira (N15bn). This leaves a monthly revenue gap of Five Billion Naira (N5bn).

This revenue gap arises due to low collection efficiency of the Discos and the non-payment of the MYTO subsidies which are required to be paid on a monthly basis to help bridge the revenue shortfalls. In the short term (i.e. the period up to April 2011), the Government aims to increase the monthly revenue collection of the industry to about N17.6bn which is slightly higher than the current basic obligations of the industry (see Table 2 below).

It should be noted however, that as generation improves, monthly obligations increase correspondingly. Nevertheless, appreciable reductions in the revenue gap can be obtained through reductions in technical and non-technical losses, the introduction of better customer care service programmes, and improvements in collection efficiency. With regard to the latter, the Government's target is to increase the total collection efficiency of the industry by at least 5% by April 2011.

**Table 2: Revenue Projection for the Nigerian Electricity Industry (Q3, 2010 to Q1, 2011)**

|                                  | UNITS                   | STATUS CONDITION | Q3 2010   | Q4 2010   | Q1 2011   |
|----------------------------------|-------------------------|------------------|-----------|-----------|-----------|
| AVAILABLE CAPACITY               | MW                      | 3,500            | 3,500     | 4,612     | 5,501     |
| CAPACITY LOAD FACTOR             | % of Capacity Available | 62               | 64        | 65        | 65        |
| ENERGY GENERATED (EG)            | GW                      | 1,584.10         | 1,635.20  | 2,188.39  | 2,610.22  |
| ENERGY CONSUMED IN POWER STATION | % of EG                 | 3                | 3         | 3         | 2         |
| ENERGY SENT OUT (ESO)            | GWh                     | 1,536.58         | 1,586.14  | 2,122.74  | 2,558.02  |
| TLF                              | % of ESO                | 9                | 9         | 9         | 9         |
| ENERGY DELIVERED TO DISCOS (EDD) | GWh                     | 1,398            | 1,443     | 1,932     | 2,328     |
| DISTRIBUTION LOSSES              | % of EDD                | 12               | 11        | 9         | 9         |
| NON-TECHNICAL LOSSES             | % of EDD                | 11               | 10        | 10        | 9         |
| ENERGY BILLED (EB)               | GWh                     | 1,076.68         | 1,140.28  | 1,564.67  | 1,908.79  |
| WEIGHTED AVERAGE TARIFF (WAT)    | N/KWh                   | 7.35             | 9.55      | 9.55      | 9.55      |
| REVENUE BILLED (RB)              | Nm                      | 7,913.59         | 10,889.66 | 14,942.63 | 18,228.99 |
| COLLECTION LOSSES                | % of RB                 | 12               | 12        | 11        | 11        |
| REVENUE COLLECTED (RC)           | Nm                      | 6,964            | 9,583     | 13,299    | 16,224    |
| VALUE ADDED TAX (VAT)            | % of RC                 | 4.76             | 4.76      | 4.76      | 4.76      |
| OUTSTANDING DEBT<br>FACTOR (ODF) | Nm                      | 200              | 200       | 200       | 200       |
| TOTAL REVENUE                    | Nm                      | 7,495            | 10,239    | 14,132    | 17,196    |

### **2.3 Performance incentives for the distribution companies in the run-up to privatisation**

The Presidential Action Committee on Power is determined that the performance targets (both operational and commercial) are reached within the time periods outlined above. To that end, the Presidential Task Force on Power has developed an incentive scheme for the staff of the distribution companies which will offer rewards for good performance and sanctions for poor performance.

The key performance indicators for this scheme include:

- Naira yield of energy delivered;
- Percentage growth in customer population;
- Percentage growth in customer response to bills;
- Percentage growth in customer metering;
- Percentage reduction in the number and frequency of transformer loss in circuit; and
- Percentage reduction in outstanding debt, and debt growth rate.

Performance will be measured and evaluated monthly and reports will be presented to the Presidential Task Force (on a monthly basis) with recommendations for rewards and sanctions.

### **3.0 Medium to long term priorities**

Although the Government intends that full responsibility for the operational effectiveness of the distribution companies should shift in 2011 from the Federal Government to the private sector, the actions and decisions of the Federal Government will continue to exert a significant impact on their commercial effectiveness. More specifically, the Government acknowledges that its policy decisions on electricity tariffs will have a direct and critical effect on the financial viability of the privatised distribution companies.

To that end, as described in Chapter 1 of this Roadmap, the Government is committed to the introduction of a genuinely cost-reflective tariff which will secure the financial viability not just of the distribution companies but of the sector as a whole.

#### 4.0 List of short term technical targets (on a zone by zone basis)

The zonal schedule of projects to address the short term capability gaps are shown in the tables below. The projects are all expected to be delivered before the end of April 2011.

N.B. In the tables below, the acronyms IGR and NPF (in the “funding source” column) stand, respectively, for “Internally Generated Revenue” and “Not Provided For”.

| ABUJA ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                                                  |                                       |                                                |                      |          |                    |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------|----------------------|----------|--------------------|
| S/N                                                          | PROJECTS                                                                                                                                         | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND/ESTIMATED COST OF PROJECTS (M#) | FUNDING SOURCE       | STATUS   | PROJECTED DUE DATE |
| 1                                                            | Upgrading of 1 x 7.5 MVA to 1 x 15MVA at power house injection s/s Minna                                                                         | 6                                     | 37m                                            | 2009 Interv. Fund    | On-going | Oct. 2010          |
| 2                                                            | Installation of 1 x 7.5MVA at ZURAMAI, Minna                                                                                                     | 12                                    | 58.2m                                          | IGR                  | On-going | Oct. 2010          |
| 3                                                            | Creation of a new 33KV feeder from Minna TS to Zarumai injection s/s 5km route length to relieve the existing overloaded power house 33KV feeder |                                       | 22.5m                                          | NPF                  | New      | April 2011         |
| 4                                                            | Create 4Nos outgoing 11KV feeder 10 Spans each from the new Zarumai injection s/s to heat the existing 11KV feeder                               |                                       | 9.2m                                           | NPF                  | New      | April 2011         |
| 5                                                            | Standardization/reconductoring of bosso 11kv feeder (3km) and 4km of LT.                                                                         |                                       | 7m                                             | NPF                  | New      | April 2011         |
| 6                                                            | Repair of 15MVA Transformer at Kontagora and provision of 50 drums of Transformer oil                                                            | 7                                     | 2M                                             | IGR                  | On-going | Sept. 2010         |
| 7                                                            | Standardization/ reconductoring of 11KV Township feeder 4KM and 4KM LT                                                                           |                                       | 8m                                             | NPF                  | New      | April 2011         |
| 8                                                            | Standardization/ reconductoring of 11KV GRA feeder HT 3KM and LT 0KM                                                                             |                                       | 5m                                             | NPF                  | New      | April 2011         |
| 9                                                            | Standardization/ reconductoring of 11KV Barraka feeder HT 3KM and LT 75KM                                                                        |                                       | 7m                                             | NPF                  | New      | April 2011         |
| 10                                                           | Installation of 1 x 15MVA Injection Substation at Lokoja town                                                                                    | 12                                    | 55.9                                           | 2009 interv. project | On-going | Nov. 2010          |
| 11                                                           | Supply and accessories for injection substation and retrofitting of panels                                                                       |                                       | 41.3                                           | DITTO                | On-going | Nov. 2010          |

|    |                                                                                                                                      |    |       |                          |          |             |
|----|--------------------------------------------------------------------------------------------------------------------------------------|----|-------|--------------------------|----------|-------------|
| 12 | Construction of a new 33kv feeder from Ajaokuta TS to the new injection s/s to relief the overloaded existing 33kv feeder            |    | 99    | NPF                      | New      | Mar. 2011   |
| 13 | Const. of 1KM 11KV line from the new inj. s/s to heat the existing 11kv line                                                         |    | 4.5   | NPF                      | New      | April 2011  |
| 14 | Reconductoring of 11KV Feeder 1 HT 3KM and LT 4KM                                                                                    |    | 7     | NPF                      | New      | April 2011  |
| 15 | Reconductoring of 11KV Feeder 2 HT 3KM and LT 4KM                                                                                    |    | 7     | NPF                      | New      | April 2011  |
| 16 | Upgrading of 1 x 7.5MVA, 1 X15MVA Injection s/s at Karu to 2 x 15MVA                                                                 | 6  | 3m    | IGR                      | Ongoing  | Sept. 2010  |
| 17 | Const. of 33kv underground fdr to evacuator power from 2 x 60MVA, 132/33 to 4Nos fdr                                                 | 20 | 193m  | IGR                      | Ongoing  | Nov. 2010   |
| 18 | Uprating 1 x 2.5 MVA to 1 x 7.5 MVA at \Nassarawa Eggon                                                                              | 4  | 80M   | IGR                      | On-going | Dec. 2010   |
| 19 | Uprating 1 x 2.5 MVA to 1 x 7.5 MVA at \Nassarawa Toto                                                                               | 4  | 80m   | IGR                      | On-going | Dec. 2010   |
| 20 | Upgrading of 1 x 2.5MVA Jiwa, to 2 x 7.5MVA                                                                                          | 12 | 50M   | IGR                      | On-going | March. 2011 |
| 21 | Standardization/rehabilitation of Jiwa, Dei-dei and Gwagwa 11kv fdr (25KM)                                                           |    | 8M    | NPF                      |          | Nov 2010    |
| 22 | Create 5nos relief 500KVA, 11/0.415KV S/S                                                                                            |    | 17.5M | NPF                      |          | Nov 2010    |
| 23 | Create 2 x 15 MVA inj. s/s at Shandam road, Lafia                                                                                    | 24 | 200M  | 2009 FGN Capital project | On-going | Nov.2010    |
| 24 | Creation of 4 nos 11kv feeders totalling up to 15 KM in Lafia town from the new 2 x 15 MVA inj. s/s to heat the existing 11KV feeder |    | 52.5M | NPF                      | New      | Nov 2010    |
| 25 | Replacement of obsolete breakers both 33 KV & 11KV at 2 x 7.5 MVA inj. s/s at Lafia                                                  |    | 47.3M | NPF                      | New      | March, 2011 |
| 26 | Creation of 15 Nos 500KVA, 11/0.415KV relief s/s in Various places in Lafia town                                                     |    | 52.5M | NPF                      | New      | Oct. 2010   |

| BENIN ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                                                                                            |                                       |                                                |                      |                                          |                    |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------|----------------------|------------------------------------------|--------------------|
| S/N                                                          | PROJECTS                                                                                                                                                                                   | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND/ESTIMATED COST OF PROJECTS (MN) | FUNDING SOURCE       | STATUS                                   | PROJECTED DUE DATE |
| 1                                                            | 1 x 7.5 MVA 33/11kv S/S at Okpanam.                                                                                                                                                        | 6                                     | 180                                            | 2009 Budget          | 95%                                      | Dec 10             |
| 2                                                            | 1 x 7.5 MVA 33/11kv S/S at Onicha Uku                                                                                                                                                      | 6                                     | 180                                            | 2009 Budget          | 95%                                      | Dec 10             |
| 3                                                            | Linking of Ikere 33kv fdr 8.5km                                                                                                                                                            | 6                                     | 34                                             | NPF                  | proposed                                 | Dec-10             |
| 4                                                            | Construction of Ilawe-Iyin-Aramoko 9.6km 33kv link line                                                                                                                                    |                                       | 38.4                                           | NPF                  | proposed                                 | Dec-10             |
| 5                                                            | Aramoko/Erinjinyan fdr 9.7 km                                                                                                                                                              |                                       | 38.8                                           | NPF                  | proposed                                 | Dec-10             |
| 6                                                            | Upgrading of Ado Ekiti 7.5MVA, 33/11kV S/S to 15MVA 33/11kV Inj. s/s                                                                                                                       |                                       | 97                                             | 2009 Interv. Project | on going                                 | Dec-10             |
| 7                                                            | 1 x 7.5 MVA 33/11kv S/S at Aiyegun/Unemene-Nekhwa                                                                                                                                          | 6                                     | 300                                            | 2009 Budget          | 89%                                      | Dec. 10            |
| 8                                                            | 33KVA electricity line from Egba junction to Iguovbiobo Urhokuosa - Ehiozvaru - Iguovbiamwen - Adesagbon - Obadan and Urhokuosa Inj. S/S project 7.5mva 33/11kv, Uhunmwode LGA , Edo State | 6                                     | 138.382                                        | 2009 & 2010 Budget   | 75%                                      | Dec 2010           |
| 9                                                            | Completion of 33KV Double Circuit O/H line to Evbuotubu                                                                                                                                    | 3                                     | 100                                            | 2010 BUDGET          | Proposed                                 | Dec-10             |
| 10                                                           | Seperation of Sapele-Koko fdr from Ikpoba Dam-10KM                                                                                                                                         | 12                                    | 40                                             | NPF                  | Proposed                                 | Dec-10             |
| 11                                                           | Fed. Secretariat s/s upgrade from 1x15mva to 2x15mva,33/11kv with complete accessories.                                                                                                    |                                       | 97                                             | NPF                  | Proposed                                 | Appril 2011        |
| 12                                                           | Construction of 1x7.5MVA, 33/11KV Injection S/S at Kwale                                                                                                                                   | 6                                     | 906.218 (Lump sum)                             | NIPP                 | 47% completed Offshore equipment on site | Dec-10             |
| 13                                                           | Construction of 1x7.5MVA, 33/11KV Injection S/S at Issele -Uku                                                                                                                             | 6                                     | Included                                       | NIPP                 | ditto                                    | Dec-10             |
| 14                                                           | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ubulu Uku                                                                                                                               | 6                                     | Included                                       | NIPP                 | ditto                                    | Dec-10             |
| 15                                                           | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ibusa                                                                                                                                   | 6                                     | Included                                       | NIPP                 | ditto                                    | Dec-10             |
| 16                                                           | Construction of 2x 15 MVA, 33/11KV Injection S/S at Agbor                                                                                                                                  | 24                                    | Included                                       | NIPP                 | ditto                                    | Dec-10             |
| 17                                                           | Construction of 1x7.5 MVA, 33/11KV Injection S/S at Onicha-Ugbo                                                                                                                            | 6.                                    | Included                                       | NIPP                 | ditto                                    | Dec-10             |
| 18                                                           | Construction of 2x15 MVA, 33/11KV Injection S/S at Asaba                                                                                                                                   | 24                                    | Included                                       | NIPP                 | ditto                                    | Dec-10             |

|    |                                                                                                               |    |      |     |          |             |
|----|---------------------------------------------------------------------------------------------------------------|----|------|-----|----------|-------------|
| 19 | IKPOBA DAM substation upgrade from 2x7.5mva to 2X15MVA ,33/11kv with complete accessories                     | 12 | 150  | NPF | Proposed | April, 2011 |
| 20 | NICOHO substation upgrade from 1x2.5mva to 1x7.5mva,33/11kv with complete accessories,33/& 11kv lines.        | 4  | 97   | NPF | Proposed | April, 2011 |
| 21 | AUCHI substation upgrade from 1x7.5mva to 1x15mva,33/11kv                                                     | 6  | 97   | NPF | Proposed | April, 2011 |
| 22 | NPA substation upgrade from 1x15mva to 2x15mva,33/11kv with complete accessories.                             | 12 | 97   | NPF | Proposed | April, 2011 |
| 23 | ARMY BARRACKS substation upgrade from 1x15mva to 2x15mva,33/11kv with complete accessories.                   | 12 | 97   | NPF | Proposed | April, 2011 |
| 24 | AMUKPE substation upgrade from 1x7.5mva,1x15mva to 2x15mva,33/11kv with complete accessories,33/& 11kv lines. | 18 | 97   | NPF | Proposed | April 2011  |
| 25 | Construction of 33kv line from Mosogar to Jesse-10km                                                          | 6  | 45   | NPF | Proposed | April 2011  |
| 26 | Reconductoring of college road fdr,33kv-1km,11kv-3km                                                          | 4  | 16.5 | NPF | Proposed | Dec-10      |
| 27 | Installation of 33kv line breaker at Ore,Line maintenance-40km                                                | 2  | 160  | NPF | Proposed | Dec-10      |
| 28 | Rehabilitation of 33kv line-11.5km,Construction of Ikole 33kv fdr-22.5km                                      | 4  | 136  | NPF | Proposed | Dec-10      |

| EKO ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                                                                |                                  |                                           |                |                |                    |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|----------------|----------------|--------------------|
| S/N                                                        | PROJECTS                                                                                                                                                       | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE | STATUS         | PROJECTED DUE DATE |
| 1                                                          | 1x15 MVA 33/11kV T/F to be installed at Ijora C/way S/Station under NIPP                                                                                       | 6.85                             | Lump Sum                                  | NIPP Funded    | on-going       | Dec. 2010          |
| 2                                                          | A (new) Ijora-Ijora C/Way III 33kV line of 1.5km is proposed to be constructed                                                                                 |                                  | 24.45m                                    | NPF            | Newly proposed | April 2011         |
| 3                                                          | Construction of 1.7km of 11kV O/H line to relief the O/Loaded Abeokuta Fdr                                                                                     |                                  | 8.2m                                      | NPF            | Ditto          | April 2011         |
| 4                                                          | Construction of 2.3km of 11kV O/H line to Costain to relief the O/Loaded EB1                                                                                   |                                  | 11.4m                                     | NPF            | Ditto          | April 2011         |
| 5                                                          | construction of 2.2km o/H 0.415kV lines.                                                                                                                       |                                  | 7m                                        | NPF            | Ditto          | April 2011         |
| 6                                                          | installation of 8No. 500kVA 11/0.415kV Transfs; Install 6No. Feeder Pillars.                                                                                   |                                  | 27m                                       | NPF            | Ditto          | April 2011         |
| 7                                                          | complete rehabilitation of entire 6.4km of the vandalised U/G Fdr is proposed                                                                                  | 12                               | 236.4m                                    | FGN            | Ditto          | April 2011         |
| 8                                                          | Replacement of 15MVA 33/11kV Failed Transformer @ Berkley Local inj. Substation                                                                                |                                  | Lump sum                                  | NIPP           | on-going       | Dec 2010           |
| 9                                                          | Replacement of 9 No. AEI aged 33kV switch gears at Berkley inj S/Station                                                                                       |                                  | 84.5m                                     | FGN            | Newly proposed |                    |
| 10                                                         | construction of 6.5km of 11kV U/G cable (2No. Feeders: Supreme Court & Macarthy) Installation of 1 set of RMU                                                  |                                  | 172.8m                                    | FGN            | Newly proposed | Dec. 2010          |
| 11                                                         | NIPP is to construct additional U/G feeder to New Idumagbo S/S                                                                                                 | 3.2                              | Lump sum                                  | NIPP           | on-going       | Dec. 2010          |
| 12                                                         | Installation of 2nd 15MVA 33/11kV additional Transf. @ New Idumagbo S/S                                                                                        |                                  |                                           | NIPP           | on-going       | April 2011         |
| 13                                                         | Replacement of 33kV & 11kV switch Gears                                                                                                                        |                                  |                                           | NIPP           | on-going       | April 2011         |
| 14                                                         | construction of 11kV U/G Cable Fdrs: 2km to relief Oba Fdr, & installation of 3No. 500kVA trf; 2km to relief Adeniyi; and 1.5km to relief Dolphin and 3No RMUs |                                  |                                           | NIPP           | on-going       | April 2011         |
| 15                                                         | Installation of 1x15MVA 33/11kV (new/4th) Trf; and Replacement of Failed 15MVA 33/11kV Transf. @ Ademola inj. S/S                                              |                                  | 215m                                      | FGN            | on-going       | Sept. 2010         |

|    |                                                                                                                                      |      |          |              |                |            |
|----|--------------------------------------------------------------------------------------------------------------------------------------|------|----------|--------------|----------------|------------|
| 16 | Replacement of 10 No. aged 33kV Switch Gears @ Ademola inj. SubStation                                                               | 7.2  | 93.8m    | FGN          | Newly proposed | April 2011 |
| 17 | Replacement of 17 No. aged 11kV Switch Gears @ Ademola inj. SubStation                                                               |      | 116.8m   | FGN          | Newly proposed | April 2011 |
| 18 | Installation of 15MVA 33/11kV additional (4th) Transf. At Berkley S/S and Flood control                                              | 6.48 | Lump Sum | NIPP Funded  | on-going       | Dec. 2010  |
| 19 | Replacement of aged 33kV Panels @ Fowler S/S                                                                                         |      | Lump Sum | NIPP Funded  | on-going       | Dec. 2010  |
| 20 | Re-inforcement of weak portions of the Cable Fdr with 1.3km of 33kV U/G cable is Proposed                                            |      | 42.9m    | NPF          | Newly proposed | April 2011 |
| 22 | Installation of additional 15MVA 33/11kV Transf @ Keffi inj. Substation.                                                             | 12   |          | 2009 INTERV. | 45%            | Dec. 2010  |
| 23 | Re-construction of 0.7km of the damaged U/G Fdr portion is proposed @ Berkley                                                        | 0.1  |          | IGR          | Newly proposed | Dec. 2010  |
| 24 | Replacement of 7.5MVA 33/11kV Transformer with 15MVA Trf @ Alagbon Local inj. Substation                                             | 5.8  | 120m     | NIPP         | on-going       | Dec. 2010  |
| 25 | Installation of Additional 15MVA Transf @ NRC                                                                                        | 4.5  | Lump Sum | NIPP         | on-going       | Dec. 2010  |
|    | Replacement of old 11kV switch gears at NRC S/S                                                                                      |      |          |              |                |            |
| 26 | Construction of 2x15MVA 33/11kV inj. Sub Station at outskirt of Unilag to improve power supply to Iwaya/Onike and UNILAG & environs. | 4.7  | Lump Sum | NIPP Funded  | on-going       | Dec. 2010  |
| 27 | Installation of 2nd 15MVA 33/11kV Transf. At Newyaba S/S                                                                             | 4.8  | Lump Sum | NIPP Funded  | on-going       | Dec. 2010  |
| 28 | Replacement of Obsolete switch Gears @ New Yaba S/S                                                                                  |      |          |              |                |            |
| 29 | Installation of 15MVA 33/11kV 2nd Transf. @ Apapa Rd Local S/S                                                                       | 4.8  | Lump Sum | NIPP         | on-going       | Dec. 2010  |
| 30 | Proposed installation of 1x15MVA 33/11kV Trf (to replace the lost 15MVA Mobitra) @ Apapa Rd Txm.                                     |      | 120m     | FGN          | Newly proposed | April 2011 |
| 31 | Replacement of old Panels @ Apapa Rd Local                                                                                           |      | Lump Sum | NIPP         | on-going       | Dec. 2010  |
| 32 | Replacement of 14 No. Old 33kV switch gears @ Apapa Mains station                                                                    | 2    | 131.5m   | FGN          | on-going       |            |
| 33 | Replacement of 16 No 11kV Switch gears @ Apapa Mains S/S                                                                             |      | 110m     | FGN          | on-going       | Dec. 2010  |
| 34 | Construction of 11kV Feeder on : wharf Rd 2km; warehouse 2km; and LT 0.415kV lines 1.2km along warehouse ;1.6km along wharf Road.    |      |          | NPF          | DITTO          | April 2011 |
| 35 | Installation of 4 No. 500kVA 0.415kV Transf on 11kV commercial Feeder.                                                               |      |          |              |                | April 2011 |
| 36 | Replacement of 4km 33kV U/G Cable: Apapa Rd - Apapa Mains Fdr                                                                        |      | 146m     | NPF          | DITTO          | April 2011 |
| 37 | Construction of Agbara - Badagry 33kV O/H line II                                                                                    |      | Lump sum | NIPP         | on-going       | Dec. 2010  |

|    |                                                                                                                                                                               |      |          |             |                |            |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|-------------|----------------|------------|
| 38 | Replacement of Failed 7.5MVA 33/11kV Trf with 15MVA Trf at Badagry inj. s/s                                                                                                   | 4.5  | 120m     | NPF         | Newly proposed | Dec. 2010  |
| 39 | Civil Engineering Construction to eliminate Flooding @ Okeira Kekere S/S                                                                                                      | 6    | 10m      | NPF         | DITTO          | April 2011 |
| 40 | Installation of 7No. 500KVA relief Trf; 9No. 500kVA uprating trfs; supply of 2No. Trf lost in circuit, installation of 8N. Feeder pilars and 250No. HRC fuses.                |      |          | IGR         |                | April 2011 |
| 41 | Construction of 2No. 11kV Feeders of total route length of 4.5km .                                                                                                            |      |          | IGR         |                | April 2011 |
| 42 | Installation of 2nd 15MVA 33/11kV Transf. @ Okeira kekere S/S                                                                                                                 |      | 130m     | NPF         | Newly proposed | April 2011 |
| 43 | construction of Sanya 1x15MVA 33/11kV inj. S/S and 33kV line project                                                                                                          | 12.8 | 194      | 2009 Budget | on-going       | April 2011 |
| 44 | construction of Itire -Sanya 33kV U/G Cable Feeder                                                                                                                            |      | 72       | NPF         |                | April 2011 |
| 45 | installation of 3rd 15MVA 33/11kV Trf at Iganmu inj. S/S                                                                                                                      | 12   | Lump sum | NIPP Funded | on-going       | Dec 2010   |
| 46 | Replacement of 11kV old switch gears @ Iganmu S/S                                                                                                                             |      |          |             |                | April 2011 |
| 47 | Reactivation of Amukoko 33kV line ex-Amuwo T/s is Required                                                                                                                    | 8.2  | 1.5m     | FGN         | Newly proposed | April 2011 |
| 48 | Replacement of Failed 15MVA Transformer @Badia inj. S/station                                                                                                                 |      |          |             | DITTO          | April 2011 |
| 49 | Construction of 2No. 1.5km 11kV Relief Feeders, 1.8km of 0.415kV line and installation of 7No.500kVA Relief S/Stations; 12No. Feeder Pillars @ Badia substation network area. |      |          |             | Newly proposed | April 2011 |
| 50 | Installation of a 2nd 15MVA 33/11kV Trf @ Orile Coker S/S                                                                                                                     | 3    | Lump sum | NIPP Funded | on-going       | April 2010 |
| 51 | construction of 33kV Akangba - Akangba 400mtrs of O/H Line                                                                                                                    | 8    | 2.5m     | FGN         | Newly proposed | April 2010 |
| 52 | Installation of 2No. 500kVA relief Trfs                                                                                                                                       |      | 6m       | FGN         | DITTO          | April 2010 |
| 53 | Construction of 33kV U/G interconnector from Idi Araba to Luth inj. S/Station                                                                                                 | 3    | 48.5m    | FGN         | DITTO          | April 2010 |

| ENUGU ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                  |                                       |                                           |                 |          |            |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------|-----------------|----------|------------|
| S/N                                                          | PROJECTS                                                                                         | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE  | STATUS   | April 2011 |
| 1                                                            | Ogbor Hill 1x7.5MVA 33/11kv Inj. S/S, Aba ex IGI 33KV Fdr                                        | 5.66                                  | Lump sum                                  | NIPP            | Ongoing  | April 2011 |
| 2                                                            | Replacement of failed T/Fs - 7x500KVA 11/0.415KV                                                 | 1.80                                  | 19,159,000                                | 2009 Intv. Fund | On-going | April 2011 |
| 3                                                            | Replacement of obsolete 11KV Panels at Umuode Inj. S/S Aba                                       |                                       | 45,486,088                                | 2009 FGN Budget | On-going | April 2011 |
| 4                                                            | Replacement of failed T/Fs - 1x500KVA, 1x300KVA 33/0.415KV & 5x500KVA 11/0.415KV                 |                                       | 19,607,500                                | 2009 Intv. Fund | On-going | April 2011 |
| 5                                                            | Aba TS 1x15MVA 33/11KV Injection substation (Voltage change-over) - as on Aba Control Fdr. Above | 2.6                                   | Lump Sum                                  | NIPP            | On-going | April 2011 |
| 6                                                            | Replacement of failed T/Fs - 2x500KVA 11/0.415KV                                                 |                                       | 5,474,000                                 | NPF             | New      | April 2011 |
| 7                                                            | Replacement of failed T/Fs - 4x500KVA 11/0.415KV                                                 | 1.60                                  | 10,948,000                                | 2009 Intv. Fund | On-going | April 2011 |
| 8                                                            | Ogbor Hill 1x7.5MVA 33/11kv Inj. S/S, Aba                                                        | 1.78                                  | Lump Sum                                  | NIPP            | On-going | April 2011 |
| 9                                                            | Replacement of failed T/Fs - 2x300KVA 33/0.415KV                                                 | 0.40                                  | 5,290,000                                 | 2009 Intv. Fund | On-going | April 2011 |
| 10                                                           | Creation of 33KV Bay at Nkalagu TS to feed Ezillo-Ishieke link-up                                |                                       | 44,000,000                                | IGR             | On-going | April 2011 |
| 11                                                           | Replacement of failed T/Fs - 2x300KVA 33/0.415KV                                                 | 0.40                                  | 5,290,000                                 | 2009 Intv. Fund | On-going | April 2011 |
| 12                                                           | Replacement of failed T/Fs - 2x300KVA 11/0.415KV                                                 | 0.40                                  | 4,312,500                                 | 2009 Intv. Fund | On-going | April 2011 |

|    |                                                                                       |       |            |                 |          |            |
|----|---------------------------------------------------------------------------------------|-------|------------|-----------------|----------|------------|
| 13 | Rehabilitation of major tee-offs on Eha Amufu 33KV line - 20km                        |       | 45,000,000 | NPF             | New      | April 2011 |
| 14 | Replacement of failed T/Fs - 4x500KVA, 3x300KVA 33/0.415KV                            | 0.60  | 21,045,000 | 2009 Intv. Fund | On-going | April 2011 |
| 15 | Re-commissioning of Nigercem 2x10MVA 33/11KV Inj S/S Nkalagu                          | 6.10  | -          | Dedicated S/S   | On-going | April 2011 |
| 16 | Replacement of failed Ndiowu 2.5MVA 33/11KV T/F                                       | 1.80  | 15,400,000 | IGR             | New      | April 2011 |
| 17 | Rehabilitation/reconductoring 2nd Agulu 33KV Feeder                                   | -     | 37,000,000 | 2010 FGN Budget | On-going | April 2011 |
| 18 | Replacement of failed dist T/Fs - 1x500KVA, 4x300KVA 33/0.415KV & 1x500KVA 11/0.415KV | 1.80  | 16,594,500 | 2009 Intv. Fund | On-going | April 2011 |
| 19 | Uprating of 10x300KVA to 500KVA 11/0.415KV S/S                                        | 1.30  | 39,528,100 | Proposal        | New      | April 2011 |
| 20 | Replacement of failed T/Fs - 4x300KVA, 2x500KVA 11/0.415KV                            | 1.50  | 14,099,000 | 2009 Intv. Fund | On-going | April 2011 |
| 21 | Replacement of failed T/Fs - 3x500KVA 33/0.415KV & 3x500KVA 11/0.415KV                | 2.25  | 18,043,500 | 2009 Intv. Fund | On-going | April 2011 |
| 22 | Replacement of failed T/Fs - 8x300KVA, 1x500KVA 33/0.415KV                            | 3     | 11,212,500 | 2009 Intv. Fund | On-going | April 2011 |
| 23 | 1x7.5MVA 33/11KV Injection S/S at 99Innoson Industries                                | 1.50  | N/A        | Dedicated       | On-going | April 2011 |
| 24 | Replacement of failed T/Fs - 3x500KVA 33/0.415KV                                      | 1.20  | 9,832,500  | 2009 Intv. Fund | On-going | April 2011 |
| 25 | 2nd 15MVA 33/11KV T/F at Gariki Inj S/S                                               | 5.05  | 65,406,483 | 2009 Intv. Fund | On-going | April 2011 |
| 26 | Replacement of failed T/Fs - 2x500KVA 11/0.415KV                                      | 0.20  | 5,474,000  | 2009 Intv. Fund | On-going | April 2011 |
| 27 | UNN 2x15MVA 33/11KV Inj S/S Nsukka ex Eha Amufu 33KV line                             | 11.45 | -          | IGR             | On-going | April 2011 |

|    |                                                                                  |       |            |                 |               |            |
|----|----------------------------------------------------------------------------------|-------|------------|-----------------|---------------|------------|
| 28 | Replacement of failed T/Fs - 1x500KVA, 3x300KVA 33/0.415KV                       | 0.80  | 11,212,500 | 2009 Intv. Fund | On-going      | April 2011 |
| 29 | Replacement of failed T/Fs - 3x300KVA 33/0.415KV                                 | 0.60  | 7,935,000  | 2009 Intv. Fund | On-going      | April 2011 |
| 30 | Oji Water works 2.5MVA 33/11KV S/S                                               | 1.70  | -          | Dedicated       | -             | April 2011 |
| 31 | Replacement of failed T/Fs - 1x500KVA 33/0.415KV                                 | 0.20  | 3,277,500  | 2009 Intv. Fund | On-going      | April 2011 |
| 32 | Fegge 1x7.5MVA 33/11KV Inj S/S Onitsha                                           | 5.70  | Lump sum   | NIPP            | On-going      | April 2011 |
| 33 | Replacement of failed T/Fs - 3x500KVA, 1x300KVA 33/0.415KV & 1x500KVA 11/0.415KV | 1.55  | 15,214,500 | 2009 Intv. Fund | On-going      | April 2011 |
| 34 | Oraifite 1x7.5MVA 33/11KV Inj S/S                                                | 2.80  | Lump Sum   | NIPP            | On-going      | April 2011 |
| 35 | Ihiala 1x7.5MVA 33/11KV Inj S/S                                                  | 2.30  | Lump Sum   | NIPP            | On-going      | April 2011 |
| 36 | Replacement of failed T/Fs - 6x500KVA, 4x300KVA 33/0.415KV                       | 2.10  | 30,245,000 | 2009 Intv. Fund | On-going      | April 2011 |
| 37 | Uprating of 7.5MVA to 15MVA 33/11kv at Otolo Inj S/S Nnewi                       | 2.80  | 45,006,874 | 2009 FGN Budget | 80% completed | April 2011 |
| 38 | Uruagu 2x7.5MVA 33/11KV Inj S/S Nnewi                                            | 3.00  | Lump Sum   | NIPP            | On-going      | April 2011 |
| 39 | Amichi 1x7.5MVA 33/11KV Inj S/S Nnewi                                            | 1.26  | Lump Sum   | NIPP            | On-going      | April 2011 |
| 40 | Replacement of failed T/Fs - 6x500KVA, 4x300KVA 33/0.415KV & 1x500KVA 11/0.415KV | 2.00  | 35,627,000 | 2009 Intv. Fund | on-going      | April 2011 |
| 41 | Army Barracks 7.5MVA 33/11kv Inj. S/S, Onitsha                                   | 4.32  | 49,996,112 | IGR             | On-going      | April 2011 |
| 42 | Replacement of failed T/Fs - 2x500KVA 33/0.415KV & 2x500KVA 11/0.415KV           | 0.80  | 12,029,000 | 2009 Intv. Fund | on-going      | April 2011 |
| 43 | 2nd 15MVA 33/11KV T/F at Awada Inj S/S                                           | 10.80 | 83,249,849 | 2009 FGN Budget | On-going      | April 2011 |

|    |                                                                                                     |      |             |                 |          |            |
|----|-----------------------------------------------------------------------------------------------------|------|-------------|-----------------|----------|------------|
| 44 | Replacement of failed T/Fs - 4x500KVA 11/0.415KV                                                    | 1.25 | 10,948,000  | 2009 Intv. Fund | On-going | April 2011 |
| 45 | Construction of 33KV line to re-route Nsugbe Leg of Umunya 33KV Feeder to Army Barracks 33KV Feeder |      | 26,305,151  | 2009 Intv. Fund | On-going | April 2011 |
| 46 | Awkuzu 1x7.5MVA 33/11KV Inj S/S                                                                     | 3.00 | Lump sum    | NIPP            | On-going | April 2011 |
| 47 | Uprating of 3-3 1x7.5MVA to 15MVA 33/11KV Inj S/S Nsugbe                                            | 4.00 | 83,950,871  | 2009 Intv. Fund | On-going | April 2011 |
| 48 | Replacement of failed T/Fs - 7x500KVA, 1x300KVA 33/0.415KV & 3x500KVA 11/0.415KV                    | 2.20 | 33,798,500  | 2009 Intv. Fund | On-going | April 2011 |
| 49 | PPI VI 500KVA 11/0.415KV S/S                                                                        | 0.20 | N/A         | Dedicated       | N/A      | April 2011 |
| 50 | Rehabilitation/reconductoring of 5km 0.415KV line                                                   | -    | 8,510,000   | Proposal        | New      | April 2011 |
| 51 | * Army Barracks 2nd 15MVA 33/11kv Inj. S/S, Onitsha                                                 | 0.60 | Lump sum    | NIPP            | On-going | April 2011 |
| 52 | Proposed Enamel Industries 500KVA 11/0.415KV S/S                                                    | 0.60 | N/A         | Dedicated       | N/A      | April 2011 |
| 53 | Proposed dedicated 2nd 15MVA 33/11KV Inj S/S at GCM Onitsha                                         | 4.00 | N/A         | N/A             | N/A      | April 2011 |
| 54 | Mbutu 1x15MVA 33/11kv Inj. S/S Mbaise                                                               | 3.10 | 119,247,329 | 2009 FGN Budget | On-going | April 2011 |
| 55 | Replacement of failed T/Fs - 1x500KVA, 4x300KVA 33/0.415KV & 5x500KVA, 1x300KVA 11/0.415KV          | 2.16 | 29,698,750  | 2009 Intv. Fund | On-going | April 2011 |
| 56 | Replacement of failed T/Fs - 4x500KVA, 4x300KVA 11/0.415KV                                          | 1.20 | 19,573,000  | 2009 Intv. Fund | On-going | April 2011 |
| 57 | Replacement of failed T/Fs - 13x500KVA, 14x300KVA 33/0.415KV & 3x500KVA 11/0.415KV                  | 5.66 | 87,848,500  | 2009 Intv. Fund | On-going | April 2011 |
| 58 | Replacement of failed T/Fs - 6x500KVA, 4x300KVA 33/0.415KV & 1x500KVA, 11/0.415KV                   | 2.30 | 32,982,000  | 2009 Intv. Fund | On-going | April 2011 |
| 59 | Urualla 2x7.5MVA 33/11KV Inj S/S                                                                    | 3.5  | 120,000,000 | IGR             | On-going | April 2011 |
| 60 | Replacement of failed T/Fs - 9x500KVA, 6x300KVA 33/0.415KV & 3x500KVA, 8x300KVA 11/0.415KV          | 4.86 | 70,828,500  | 2009            | On-going | April 2011 |
| 61 | Replacement of failed T/Fs - 2x500KVA, 1x300KVA 33/0.415KV & 1x300KVA 11/0.415KV                    | 1.60 | 11,356,250  | 2009 Intv. Fund | Ongoing  | April 2011 |

|    |                                                                                                   |      |             |                 |          |            |
|----|---------------------------------------------------------------------------------------------------|------|-------------|-----------------|----------|------------|
| 62 | Ohafia 1x15MVA 33/11KV Inj S/S                                                                    | 2.60 | Lump Sum    | NIPP            | Ongoing  | April 2011 |
| 63 | Replacement of failed T/Fs - 2x500KVA, 2x300KVA 33/0.415KV & 1x500KVA 11/0.415KV                  | 1.00 | 14,582,000  | 2009 Intv. Fund | Ongoing  | April 2011 |
| 64 | Proposed 9.8km Orji 33KV Feeder from Egbu 132/33KV TS [associated with Orji 15MVA Inj S/S Owerri] |      | Lump        | NIPP            | On-going | April 2011 |
| 65 | Orji 1x15MVA 33/11KV Inj S/S                                                                      | 9.25 | Lump        | NIPP            | On-going | April 2011 |
| 66 | Isuochi 1x7.5MVA 33/11kv Inj. S/S                                                                 | 3.00 | Lump        | NIPP            | On-going | April 2011 |
| 67 | Urualla 2x7.5MVA 33/11KV Inj S/S                                                                  | 3.5  | 120,000,000 | IGR             | On-going | April 2011 |
| 68 | Replacement of failed T/Fs - 9x500KVA, 6x300KVA 33/0.415KV & 3x500KVA, 8x300KVA 11/0.415KV        | 4.86 | 70,828,500  | 2009            | On-going | April 2011 |

| IBADAN ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                                                                        |                                       |                                                |                |                |                    |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------|----------------|----------------|--------------------|
| S/N                                                           | PROJECTS                                                                                                                                                               | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND/ESTIMATED COST OF PROJECTS (NM) | FUNDING SOURCE | STATUS         | PROJECTED DUE DATE |
| 1                                                             | Upgrading of existing Apata 2x7.5MVA 33/11KV S/S to 2x15MVA 33/11KV S/S                                                                                                | 36                                    | 196,437,979.00                                 | 2009 Budget    | 95% Completion | Dec, 2010          |
|                                                               | 1x 15MVA, 33/11KV IYAGANKU INJ S/S                                                                                                                                     |                                       | 198,578,304.00                                 |                |                |                    |
|                                                               | Extension of 30Km route length of 33kV line to pick the proposed 2x15MVA 33/11 KV INJ S/S at Apata and the 1x15MVA 33/11KV at Iyaganku and 20km extension of 11kV line |                                       | 215,000,000.00                                 | New Project    | Proposed       | April, 2011        |
|                                                               | Installation of 10 No 500KVA 11/0.415KV distribution transformers with all accessories                                                                                 |                                       | 50,000,000.00                                  |                |                |                    |
| 2                                                             | Additional 15MVA, 33/11KV Transformer to existing Odiolowo 15MVA S/S                                                                                                   | 12                                    | 200,000,000.00                                 | 2009 Budget    | 95% Completion | Dec 2010           |
|                                                               | Construction of 3km route length of 11KV feeders                                                                                                                       |                                       | 12,000,000.00                                  | NPF            | Proposed       | April, 2011        |
| 4                                                             | Installation of 10 No 500KVA 11/0.415KV distribution transformers with all accessories                                                                                 |                                       | 50,000,000.00                                  | NPF            | Proposed       |                    |
| 5                                                             | Additional 1x15MVA 33/11KV S/S to the existing 1x15MVA 33/11KV S/S at Ilesha Rd, Oshogbo                                                                               | 12                                    | Lump sum                                       | NIPP           | 20% Completion | April 2011         |
| 6                                                             | Additional 15MVA, 33/11KV Transformer to existing Ikirun Rd, 15MVA 33/11KV INJ S/S                                                                                     | 12                                    | 155,000,000.00                                 | 2009 Budget    | 95% completion | Dec. 2010          |
| 7                                                             | Construction of 1km route length of 11KV feeders                                                                                                                       |                                       | 4,000,000.00                                   | NPF            | Proposed       | April 2011         |
| 8                                                             | Installation of 15 No 500KVA 11/0.415KV distribution transformers with all accessories                                                                                 |                                       | 60,000,000.00                                  | NPF            | Proposed       |                    |
| 9                                                             | 5km extension of 415V LT network                                                                                                                                       |                                       | 10,000,000.00                                  | NPF            | Proposed       |                    |
| 21                                                            | 1 x 15 MVA 33/11KV S/S at GAA IMAM                                                                                                                                     | 12                                    | 190,000,000.00                                 | 2009 Budget    | 80% Comp.      | Dec 2010           |
| 22                                                            | 1No 33kV incomer and 3No, 11KV outgoing to be replaced                                                                                                                 |                                       | 16,000,000.00                                  | New Project    | Proposed       | 30 April 2011      |
| 23                                                            | 1 x 15 MVA 33/11KV S/S at IKIRUN                                                                                                                                       | 12                                    | 155,000,000.00                                 | 2009 Budget    | 95% Comp.      | Dec 2010           |
| 24                                                            | 1 x 15 MVA 33/11KV S/S at Abeokuta road, Ota                                                                                                                           | 12                                    | LUMP SUM                                       | NIPP           | Ongoing        | April 2011         |

| IKEJA ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                           |                                  |                                           |                |                 |                    |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|----------------|-----------------|--------------------|
| S/N                                                          | PROJECTS                                                                                                                  | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE | STATUS          | PROJECTED DUE DATE |
| 1                                                            | Proposed 1 x 15MVA at Alausa injection substation                                                                         | 10.5MW                           | Lump Sum                                  | NIPP           | 47% Comp.       | April, 2011        |
| 2                                                            | Replacement of obsolete 2 sets of 11KV breaker panels at Alausa injection substation for the purpose of network stability |                                  | 57,600,000                                | New Project    | Yet to commence | April, 2011        |
| 3                                                            | Construction of 30NO 500KVA S/S to relieve overloaded ones                                                                |                                  | 189,429,060                               | New Project    | DITTO           | April, 2011        |
| 4                                                            | Construction of 2NO 11KV feeders for evacuation of the load                                                               |                                  | 28,297,216                                | New Project    | DITTO           | April, 2011        |
| 5                                                            | Reconductoring and rehabilitation of undersized 20km route length of L. V O/H lines                                       |                                  | 24,274,000                                | New Project    | DITTO           | April, 2011        |
| 6                                                            | Proposed 1 x 15MVA at olowora                                                                                             | 30MW                             | Lump Sum                                  | NIPP           | 47% Comp.       | April, 2011        |
| 7                                                            | Proposed 1 x 15MVA 33/11KV inj. s/s and 1 set of 11kv panels at Warewa                                                    |                                  | 150,000,000                               | NPF            | Yet to commence | April, 2011        |
| 8                                                            | Proposed 1 x 15MVA 33/11KV inj. s/s and 1 set of 11kv panels at Isheri                                                    |                                  | 150,000,000                               | NPF            | DITTO           | April, 2011        |
| 9                                                            | Construction of new Alausa- Opic 33kv fdr from Alausa Tx. Inj., s/s                                                       |                                  | 71,115,014                                | NPF            | DITTO           | April, 2011        |
| 10                                                           | Construction of 40NO 500KVA substations.                                                                                  |                                  | 257,568,080                               | NPF            | DITTO           | April, 2011        |
| 11                                                           | Rehabilitation of Ojodu 33kv feeder plus 5km route length of reconductoring to ensure system stability.                   |                                  | 9,500,000                                 | NPF            | DITTO           | April, 2011        |
| 12                                                           | Construction of 6NO 11KV feeders (6km)                                                                                    |                                  | 84,886,158.78                             | NPF            | DITTO           | April, 2011        |
| 13                                                           | Reconstruction of 20km L. T reticulation                                                                                  |                                  | 9,032,595                                 | NPF            | DITTO           | April, 2011        |
| 14                                                           | Construction of 90km of L. V. reticulation                                                                                |                                  | 183,488,954                               | NPF            | DITTO           | April, 2011        |
| 15                                                           | Proposed 1 x 15MVA NIPP project at Magodo Inj. s/s                                                                        | 5.5MW                            | Lump sum                                  | NIPP           | 47%             | April, 2011        |
| 16                                                           | Reconductoring and rehabilitation of undersized 10km route length of 33kv lines                                           |                                  | 4,516,298                                 | New project    | Yet to commence | April, 2011        |
| 17                                                           | 1X 15MVA inj. s/s at Adeniyi Jones                                                                                        | 12                               | Lump sum-                                 | NIPP           | 47%             | April, 2011        |

|    |                                                                                                                                 |        |               |             |                 |             |
|----|---------------------------------------------------------------------------------------------------------------------------------|--------|---------------|-------------|-----------------|-------------|
| 18 | 1X 15MVA inj. s/s at Ogba Ijaye                                                                                                 | 12     | Lump sum-     | NIPP        | 47%             | April, 2011 |
| 19 | 1X 15MVA inj. s/s at Agidingbi                                                                                                  | 12     | Lump sum-     | NIPP        | 47%             | April, 2011 |
| 20 | 1X 15MVA inj. s/s at Akute                                                                                                      | 12     | Lump sum-     | NIPP        | 47%             | April, 2011 |
| 21 | 1X 15MVA inj. s/s at Lambe                                                                                                      | 12     | Lump sum-     | NIPP        | 47%             | April, 2011 |
| 22 | Replacement of faulty 15MVA AT/F at Itire Inj. s/s                                                                              | 4.9MW  | 126,690,000   | New project | Yet to commence | Apr-11      |
| 23 | Reconductoring of 42km route length of 11kv fdrs in Ago Okota and Isolo. Also reconductoring of 48km route of LV overhead lines | 4.9MW  | 75,300,026.6  | New project | DITTO           | Apr-11      |
| 24 | Construction of 10 No. 500KVA relief substations                                                                                |        | 63,142,207.8  | New project | DITTO           | Apr-11      |
| 25 | Rehabilitation of 5km length of Egbe 33kv fdr from Ejigbo t/s                                                                   | 16.3MW | 9,000,000     | New project | DITTO           | Apr-11      |
| 26 | NIPP project 1x15MVA concurrently going on at both Igando and Ijegun injection substations will close the gap                   |        | -<br>Lump sum | NIPP        | On-going        | -<br>Apr-11 |
| 27 | Const. 5 no 11kv fdrs to relieve the existing overloaded fdrs (20km)                                                            |        | 40,775,320    | New project | Yet to commence | Apr-11      |
| 28 | Const. of 20 No 500KVA substation oto relieve overloaded ones                                                                   |        | 126,284,400   | New project | DITTO           | Apr-11      |
| 29 | Const. of Paul Balogun 11kv fdr to relieve O/L , Oworo 11kv fdr                                                                 | 6.16MW | 22,000,000    | NPF         | DITTO           | Apr-11      |
| 30 | Repalacement of 3 sets of obsolete 11kv breaker panels at Oworo inj. Substation                                                 | 4.8MW  | 86,400,000    | NPF         | DITTO           | Apr-11      |
| 31 | Reconstruction and reconductoring of 50km route length of L. T O/H lines                                                        |        | 60,685,000    | NPF         | DITTO           | Apr-11      |
| 32 | Replacement of 2 33KV faulty breakers                                                                                           | 12MW   | 120,000,000   | NPF         | DITTO           | April 2011  |
| 33 | Replacement of obsolete 2 sets of 11KV breaker panels on Alausa                                                                 |        | 57,600,000    | NPF         | DITTO           | April 2011  |
| 34 | Construction of relief 40 Nos. 500KVA O/L transformers                                                                          |        | 257,568,080   | NPF         | DITTO           | April 2011  |
| 35 | 4. Reconstruction and reconductoring of 70km of LV reticualtion                                                                 |        | 32,650,350    | NPF         | Yet to commence | April 2011  |
| 36 | Dedicated feeder to companies. Gap due to tx limitation                                                                         | 8.1MW  |               | NPF         |                 | April 2011  |

| <b>JOS ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects)</b> |                                                                                                                                                                                       |                                                 |                                                              |                           |               |                               |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------|---------------------------|---------------|-------------------------------|
| <b>S/N</b>                                                        | <b>PROJECTS</b>                                                                                                                                                                       | <b>CONTRIBUTION<br/>TOWARDS GAP<br/>CLOSURE</b> | <b>ALLOCATED<br/>FUND/ESTIMATED<br/>COST OF<br/>PROJECTS</b> | <b>FUNDING<br/>SOURCE</b> | <b>STATUS</b> | <b>PROJECTED<br/>DUE DATE</b> |
| 1                                                                 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Otukpo(near stadium), Otukpo Business Unit                                                                                         | 4.5                                             | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 2                                                                 | Design, manufacture and supply of 1 x 7.5mva and 1x 2.5mva 33/11kv power transformers for replacement of faulty ones at west of mines injection in jos and zonal stores respectively. | 15                                              | 140                                                          | 2009<br>Intv. fund        | 65%           | dec-10                        |
| 3                                                                 | Design, manufacture and supply of 1 x 15mva 33/11kv power transformers for replacement of faulty ones at bauchi road injection in jos.                                                |                                                 |                                                              |                           | 65%           | dec-10                        |
| 4                                                                 | Proposed 2x15MVA, 33/11KV Injection S/S at Zaria Rd., near Stadium, Jos                                                                                                               | 7.6                                             | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 5                                                                 | Proposed of 1x7.5MVA, 33/11KV Injection S/S at Car Wash, opposite Miango Rd., off-Rukuba Rd., Jos                                                                                     | 8.16                                            | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 6                                                                 | Construction of 2x7.5MVA, 33/11KV Injection S/S at Lamingo Jos, Jos Business Unit.                                                                                                    | 6.72                                            | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 7                                                                 | Proposed 1x7.5MVA, 33/11KV Injection S/S at Barkin Ladi Bukuru Business Unit                                                                                                          | 3.6                                             | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 8                                                                 | Proposed 1x7.5MVA, 33/11KV Injection S/S at Mararabam jam'a Bukuru Business Unit                                                                                                      | 3.6                                             | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 12                                                                | Construction of 1x7.5MVA, 33/11KV Injection S/S at Gombe Road Bauchi, Bauchi Business Unit                                                                                            | 6.2                                             | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 13                                                                | Construction of 1x7.5MVA, 33/11KV Injection S/S at Bauchi Road, Gombe                                                                                                                 | 5.22                                            | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |
| 14                                                                | Construction of 1x7.5MVA, 33/11KV Injection S/S at Misau Road Azarei, Azare Business Unit                                                                                             | 2.73                                            | Lump Sum                                                     | NIPP                      | Ongoing       | Dec-10                        |

| KADUNA ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                     |                                       |                      |                |        |                  |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------|----------------|--------|------------------|
| S/N                                                           | PROJECTS                                                                                                            | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND (N M) | FUNDING SOURCE | STATUS | PROJECT DUE DATE |
| 1                                                             | Construction of 15km,33kv line from mando t.s to abakpa                                                             | 19 MW                                 |                      | NPF            | 0%     | April 2011       |
| 2                                                             | Addition of 1no 15mva,33/11kv t/f at abakpa inj. S/s.                                                               |                                       |                      |                |        | April 2011       |
| 3                                                             | Construction of 4km, 11kv line from proposed additional 15mva t/f at abakpa                                         |                                       |                      |                |        | April 2011       |
| 4                                                             | Proposed 300kva 11/0.415kv relief s/s At sarkin tsauni                                                              |                                       | 2.827                | 2009 budget    |        | DEC 2010         |
| 5                                                             | 300kva 11/0.415 relief s/s at river rd                                                                              |                                       | 2.827                | 2009 interv.   |        | DEC 2010         |
| 6                                                             | Proposed 300kva releif s/s at a/yaro kwaru                                                                          |                                       | 2.827                |                |        | April 2011       |
| 7                                                             | Uprating 300kva of badarawa s/s to 500kva.                                                                          |                                       | 1.60                 |                |        | April 2011       |
| 8                                                             | I)uprating of 7.5mva to 15mva t/f at dawaki inj. S/s.<br>(ii) construction of3km,11kv feeder from dawaki inj. S/s). | 5MW                                   | 139.814              | 2009 interv.   | 80%    | Dec, 2010        |
| 9                                                             | Uprating of 200kva b/stop iii to 300kva.                                                                            |                                       | 1.2                  | Ditto          |        | April, 2011      |
| 10                                                            | Uprating of 300kva bissau rd s/s to 500kva                                                                          |                                       | 2.836                | 2009 budget    |        | Feb. 2011        |
| 11                                                            | Uprating of 300kva ishaku rd s/s to 500kva                                                                          |                                       | 2.836                | 2009 interv.   |        | April 2011       |
| 12                                                            | Uprating of 2x7.5mva inj. S/s at gusau road to 2x15mva                                                              | 12.1                                  | 92                   | 2009 interv.   | 60%    | Dec2010          |
| 13                                                            | (I) additional 1no 7.5mva t/f at yelwa yauri.                                                                       | 2.1                                   | 120                  | 2009 budget    | 30%    | March, 2011      |
| 14                                                            | (II) construction of 3km 11kv feeder                                                                                |                                       |                      |                |        |                  |
| 15                                                            | Construction of 2x7.5mva,33/11kv inj. S/s at borstal home barnawa                                                   | 9                                     | 146.743              | 2009 interv.   | 40%    | Nov. 2010        |
| 16                                                            | Construction of 2x15mva inj.s/s at narayi                                                                           | 15.1                                  | 165                  | NIPP           | 8%     | April 2011       |
| 17                                                            | Construction of 1x2.5mva inj. S/s at zambia crescent                                                                | 2.5                                   | 64                   | NIPP           | 8%     | April, 2011      |

| <b>KANO ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects)</b> |                                                                                                                    |                                         |                                                  |                       |                   |                           |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|-----------------------|-------------------|---------------------------|
| <b>S/N</b>                                                         | <b>PROJECTS</b>                                                                                                    | <b>CONTRIBUTION TOWARDS GAP CLOSURE</b> | <b>ALLOCATED FUND/ESTIMATED COST OF PROJECTS</b> | <b>FUNDING SOURCE</b> | <b>STATUS</b>     | <b>PROJECTED DUE DATE</b> |
| 1                                                                  | <b>WATER WORKS</b><br>Completion of ongoing 1X7.5MVA, 33/11KV Water Works Inj. S/S. (NIPP Project)                 | 5.8                                     | Lump sum                                         | NIPP                  | On-going          | 30-Apr-2011               |
| 2                                                                  | Transfer 2MW from Tamburawa W/Works to the proposed 2nd Water Works 11KV Fdr ex-Water Works 1X7.5MVA NIPP Inj. S/S |                                         | 3.                                               | NPF                   | Work yet to start | 30-Apr-2011               |
| 3                                                                  | Uprating of 6nos. Distribution Transformers                                                                        |                                         | 19.47                                            | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 4                                                                  | Rehabilitation of 10nos. substandard Dist. S/S                                                                     |                                         | 4.150                                            | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 5                                                                  | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                           |                                         | 3.125                                            | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 6                                                                  | <b>NOMANSLAND</b><br>Transfer 1.5MW from 11KV Nomansland Fdr back 11KV Abuja & Sabon Gari Fdrs.                    | 2.64                                    | 1.502                                            | NPF                   | DITTO             | 30-Apr-2011               |
| 7                                                                  | Uprating of 5nos. Distribution Transformers                                                                        |                                         | 16.225                                           | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 8                                                                  | Rehabilitation of 10nos. substandard Dist. S/S                                                                     |                                         | 4.15                                             | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 9                                                                  | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                           |                                         | 2.546                                            | 2010 Budget           | DITTO             | 30-Apr-2011               |
| 10                                                                 | <b>GWAMAJA</b><br>Transfer 1.3MW from 11KV Fed. Sec. Fdr to 11KV Gwamaja fdrs                                      | 12.1                                    | 3                                                | NPF                   |                   | 30-Apr-2011               |
| 11                                                                 | Uprating of 5nos. Distribution Transformers                                                                        |                                         | 16.225                                           | 2010 Budget           | Yet to start      | 30-Apr-2011               |
| 12                                                                 | Rehabilitation of 5nos. substandard Dist. S/S                                                                      |                                         | 2.075                                            | 2010 Budget           | Yet to start      | 30-Apr-2011               |
| 13                                                                 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                           |                                         | 2.624                                            | 2010 Budget           | Yet to start      | 30-Apr-2011               |
| 14                                                                 | Replacement of 11KV Bachirawa Outgoing Breaker.                                                                    |                                         | 3.750                                            | NPF                   | DITTO             | 30-Apr-2011               |

|    |                                                                                                                                        |       |        |             |                                                          |             |
|----|----------------------------------------------------------------------------------------------------------------------------------------|-------|--------|-------------|----------------------------------------------------------|-------------|
| 15 | Replacement of 11KV Barracks Outgoing Breaker.                                                                                         |       | 3.75   | NPF         | DITTO                                                    | 30-Apr-2011 |
| 16 | <b>KANO CITY</b><br>Transfer 8MW of 11KV City Fdr into 2 new 11KV Feeders at proposed 1X15MVA, 33/11KV Ado Bayero Inj. S/S.            | 8.8   | 18.024 | NPF         | DITTO                                                    | 30-Apr-2011 |
| 17 | Deload 11KV City Feeder to old 11KV K/Nassarawa Feeder by 2MW.                                                                         |       | 6.564  | NPF         | DITTO                                                    | 30-Apr-2011 |
| 18 | Replacement of 11KV City Outgoing Breaker.                                                                                             |       | 3.75   | NPF         | DITTO                                                    | 30-Apr-2011 |
| 19 | Uprating of 5nos. Distribution Transformers                                                                                            |       | 16.225 | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 20 | Rehabilitation of 8nos. substandard Dist. S/S                                                                                          |       | 3.32   | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 21 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                               |       | 2.546  | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 22 | Transfer 1MW from 11KV IbrahimTaiwo Fdr to proposed Kofar Mata 1X7.5MVA NIPP Inj. S/S.                                                 | 12.41 | 3.358  | NPF         | DITTO                                                    | 30-Apr-2011 |
| 23 | Replacement of 11KV Ibrahim Taiwo Fdr Outgoing Breaker.                                                                                |       | 3.750  | NPF         | DITTO                                                    | 30-Apr-2011 |
| 24 | Rehabilitation of 8nos. substandard Dist. S/S                                                                                          |       | 3.32   | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 25 | Replacement of 11KV Ajasa Fdr Outgoing Breaker.                                                                                        |       | 3.75   | NPF         | DITTO                                                    | 30-Apr-2011 |
| 26 | Transfer entire load of 11KV Kofar Nassarawa to proposed Kofar Mata 1X7.5MVA NIPP Inj. S/S.                                            |       | 6      | NPF         | DITTO                                                    | 30-Apr-2011 |
| 27 | Uprating of 3nos. Distribution Transformers                                                                                            |       | 9.735  | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 28 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                               |       | 2.546  | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 29 | Transferring 11KV Audu Bako Feeders to proposed Farm Center NIPP 2X15MVA, 33/11KV Inj. S/S. (i.e. deloading the 33KV Feeder by 10.3MW) | 3.7   | 36.048 | NPF         | Inj. S/S civil wrks 80%. Electromech nical yet to start. | 30-Apr-2011 |
| 30 | Uprating of 3nos. Distribution Transformers                                                                                            |       | 9.735  | 2010 Budget | Work yet to start                                        | 30-Apr-2011 |
| 31 | Rehabilitation of 12nos. substandard Dist. S/S                                                                                         |       | 4.98   | 2010 Budget | DITTO                                                    | 30-Apr-2011 |
| 32 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                               |       | 4.036  | 2010 Budget | DITTO                                                    | 30-Apr-2011 |

|    |                                                                                         |      |              |             |                             |             |
|----|-----------------------------------------------------------------------------------------|------|--------------|-------------|-----------------------------|-------------|
| 33 | Transfer of 1.5MW from Race Course to proposed Farm Centre 2X7.5MVA NIPP Inj. S/S.      | 3    | 7.515        | NPF         | DITTO                       | 30-Apr-2011 |
| 34 | Uprating of 4nos. Distribution Transformers                                             |      | 12.98        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 35 | Rehabilitation of 9nos. substandard Dist. S/S                                           |      | 9.960        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 36 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                |      | 5.028        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 37 | <b>GEZAWA</b><br>Rehabilitation of 33KV Gezawa Fdr                                      | 12.8 | 17           | NPF         | DITTO                       | 30-Apr-2011 |
| 38 | Rehabilitation of 7nos. substandard Dist. S/S                                           |      | 2,905,000.00 | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 39 | Deloading the Ringim leg by 5MW to Dutse 2X30MVA, 132/33KV T/S.                         |      | -            |             | Jigawa state Gov Project    | 30-Apr-2011 |
| 40 | Transfer 1.5MW from 11KV M. Mohd Fdr to 11KV Abuja Feeder                               | 3.89 | 3            | NPF         |                             | 30-Apr-2011 |
| 41 | Rehabilitation of 10nos. substandard Dist. S/S                                          |      | 9.96         | 2010 Budget | Work yet to start           |             |
| 42 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                |      | 4.036        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 43 | Transfer entire 11KV Lamido Fdr (3.5MW) to proposed 2X15MVA Walalambe Inj. S/S.         |      | 31.028       | NPF         | Awaitng Walambe Project     |             |
| 44 | <b>DAKATA</b><br>Rehabilitation of 6nos. substandard Dist. S/S on 11KV Dakata Fdr       | 0.97 | 2.49         | 2010 Budget | Work yet to start           | 30-Apr-2011 |
| 45 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                |      | 4.265        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 46 | Rehabilitation of 5nos. substandard Dist. S/S on 11KV Yankaba Fdr                       |      | 2.075        | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 47 | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                |      | 3.58         | 2010 Budget | DITTO                       | 30-Apr-2011 |
| 48 | <b>KOFAR GUGA</b><br>Installation of 7.5MVA, 33/11KV Transformer at Kofar Guga Inj. S/S |      | 4.506        | NPF         | No Transformer Oil & Cables | 30-Apr-2011 |

|    |                                                          |      |        |                              |                   |             |
|----|----------------------------------------------------------|------|--------|------------------------------|-------------------|-------------|
| 49 | Rehabilitation of 15nos. substandard Dist. S/S           | 4.41 | 6.225  | Partly funded by 2010 Budget | Work yet to start | 30-Apr-2011 |
| 50 | Purchase of Upriser & LV Cables for vandalised Dist. S/S |      | 6.195  | DITTO                        | DITTO             | 30-Apr-2011 |
| 51 | <b>GUMEL</b><br>Rehabilitation of 33KV Gumel Fdr         | 1.59 | 13.692 | NPF                          | DITTO             | 30-Apr-2011 |
| 52 | Rehabilitation of 12nos. substandard Dist. S/S           |      | 4.890  | 2010 Budget                  | DITTO             | 30-Apr-2011 |
| 53 | Purchase of Upriser & LV Cables for vandalised Dist. S/S |      | 4.150  | 2010 Budget                  | DITTO             | 30-Apr-2011 |

| PORT HARCOURT ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects) |                                                                                                                  |                                       |                      |                        |                                                                         |                    |
|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------|------------------------|-------------------------------------------------------------------------|--------------------|
| S/N                                                                  | PROJECTS                                                                                                         | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND (N M) | FUNDING SOURCE         | STATUS                                                                  | PROJECTED DUE DATE |
| 1                                                                    | Proposed 1 X 15MVA, 33/11KV Inj.S/S at Port Harcourt Town Transmission Premises,PH                               | 0.5                                   | 53                   | IGR                    | 15MVA 33/11KV T/F is on plinth, 33KV Gantry has been erected (80%)      | Sept 2010          |
| 2                                                                    | Installation of additional 1 x 15MVA 33/11KV Transformer at UTC 1 x 15MVA 33/11kV Substation ,Port Harcourt      | 15.1                                  | 44.207               | 2009 INTERVENTION FUND | T/F placed on plinth & Wiring of T/F and Breaker yet to commence.( 40%) | Oct 2010           |
| 3                                                                    | Completion of Silverbird 1 x 15MVA 33/11KV S/S (Electromechanical Works) and construction of 33KV Line (0.55km)  |                                       | 141.694              | 2009 Budget            | Civil Works Completed                                                   | Dec 2010           |
| 4                                                                    | Installation of 26 x 500KVA 11/0.415KV Substations to relieve 26No overloaded transformers Old GRA and NPA area. |                                       | 171.60               | NPF                    |                                                                         | April 2011         |
| 5                                                                    | Proposed replacement of 2nd 15MVA,33/11KV Transformer at Eket Injection Substation                               | 7.0                                   | 44.207               | 2009 INTERVENTION FUND | T/F placed on plinth & Wiring of T/F and Breaker on going60%            | Sept.2010          |
| 6                                                                    | Replacement of 10No bad feeder pillars in Ogoja and environs.                                                    |                                       | 1.8                  | NPF                    |                                                                         | April 2011         |

|    |                                                                                                                                 |     |          |             |                                           |             |
|----|---------------------------------------------------------------------------------------------------------------------------------|-----|----------|-------------|-------------------------------------------|-------------|
|    | Installation of 6 X 500KVA 11/0.415KV Substations to relieve 6No overloaded ones in Eket Town.                                  |     | 33.6     | NPF         |                                           | April 2011  |
| 7  | Completion of Agip Okporo 1 X 15MVA, 33/11KV Injection Substation, Port Harcourt.                                               | 7.1 | 31.855   | 2009 Budget | Civil Works Completed                     | Dec2010     |
| 8  | Completion of Aba Road & Okoh 11KV feeders, Ex Agip-Okporo Injection Substation.                                                |     | 1.869    | 2009 Budget | O/H Line Completed, U/G Works outstanding | Nov. 2010   |
| 9  | Installation of 23 x 500KVA ,11/0.415KV Substations to relieve 23No overloaded transformers in Choba and environs.              |     | 125.6    | NPF         | Yet to commence                           | April 2011  |
| 10 | Completion of Ikot Udom, Ika LGA 1 X 7.5MVA, 33/11KV Injection Substation, Akwa Ibom.                                           | 12  | 7.690    | 2009 Budget | Civil Works Completed                     | Dec 2010    |
| 11 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Abak                                                                                   |     | Lump sum | NIPP        |                                           | Dec 2010    |
| 12 | Proposed rehabilitation of Abak 33KV Feeder Ex. Uyo T/S and all its Tee-Offs (374.21km Route Length)                            |     | 41.35    | NPF         | Yet to commence                           | Dec 2013    |
| 13 | Derating of 15No 33/0.415KV distribution transformers to 11/0.415KV transformers in Ikot Udom Ika LGA,Ikot Ekpene Business Unit |     | 78.4     | NPF         | Yet to commence                           | Dec 2013    |
| 14 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Ahoada                                                                                 | 12  |          | NIPP        | Ongoing                                   | April, 2011 |
| 15 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Abonema                                                                                | 6   |          | NIPP        | Ongoing                                   | April, 2011 |
| 16 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Abua                                                                                   | 6   |          | NIPP        | Ongoing                                   | April, 2011 |
| 17 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Degema                                                                                 | 6   |          | NIPP        | Ongoing                                   | April, 2011 |
| 18 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Elieta (Omoku)                                                                         | 6   |          | NIPP        | Ongoing                                   | April, 2011 |
| 19 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Omoku                                                                                  | 6   |          | NIPP        | Ongoing                                   | April 2011  |
| 20 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Isiokpo                                                                                | 6   |          | NIPP        | Ongoing                                   | April 2011  |
| 21 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Elele                                                                                  | 6   |          | NIPP        | Ongoing                                   | April 2011  |

| <b>YOLA ELECTRICITY DISTRIBUTION COMPANY (Short Term Projects)</b> |                                                                                                                      |                                                      |                                                                    |                           |                       |                               |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------|---------------------------|-----------------------|-------------------------------|
| <b>S/N</b>                                                         | <b>PROJECTS</b>                                                                                                      | <b>CONTRIBUTION<br/>TOWARDS GAP<br/>CLOSURE (MW)</b> | <b>ALLOCATED<br/>FUND/ESTIMATE<br/>D COST OF<br/>PROJECTS (NM)</b> | <b>FUNDING<br/>SOURCE</b> | <b>STATUS</b>         | <b>PROJECTED<br/>DUE DATE</b> |
| 1                                                                  | Upgrading of 1X15MVA to 2x 15mva 33/11kv injection s/s at бага road and 4 additional 11kv feeders at mmc secretariat | 8                                                    | 300,000,000                                                        | NPF                       | New projects          | Apr-11                        |
| 2                                                                  | Construction Of 1x 15mva 33/11kv Injection S/S And 2 Additional 11kv Feeders At Jiddari Polo                         | 5.7                                                  | 190,000,000                                                        | NPF                       | New Project           | Apr-11                        |
| 3                                                                  | Construction Of 1x 15mva 33/11kv Injection S/S And 2 Additional 11kv Feeders At Abujan Talakawa                      | 3.5                                                  | 198,000,000                                                        | NPF                       | New Project           | Apr-11                        |
| 4                                                                  | Upgrading Of 1x 2.5mva 33/11kv Injection S/S To 1x7.5mva, 33/11kv Inj. S/S At Maiduguri (Chad Basin)                 | 1.6                                                  | 130,000,000                                                        | NPF                       | New Project           | Apr-11                        |
| 5                                                                  | 1x 7.5mva 33/11kv Injection S/S And 2 Additional 11kv Feeders At Mayo Gwai 2.Replacement Of Obsolate Switchgears     | 3                                                    | 64,410,000                                                         | 2009 Intervention         | On Going Project      | Dec 10                        |
| 6                                                                  | UPGRADING OF 2.5MVA, TO 7.5MVA,33/11 Injection Substation At Wukari                                                  | 2                                                    | 130                                                                | NPF                       | NEW PROJECT           | April, 2011                   |
| 7                                                                  | .Upgrading Of 2.5mva, To 5mva,33/11 And. Rehabilitation Of The Existing 11kv Netwok At Michika                       | 3                                                    | 35                                                                 | NPF                       | Fgn Interv. 2009      | Dec 2010                      |
| 8                                                                  | Upgrading Of 2.5mva, To 7.5mva,33/11 And Rehabilitation Of The Existing 11kv Netwok At Gombi                         | 2                                                    | 130                                                                | 2009 Interv Fund          | Transformer On Plinth | April, 2011                   |
| 9                                                                  | 1.Upgrading Of 2.5mva, To 5mva,33/11 At Uba Town And Rehabilitation Of The Existing 11kv Network                     | 3                                                    | 169                                                                | NPF                       | New Project           | April 2011                    |
| 10                                                                 | Construction Of Additional 11kv Feeder In Maiduguri Rd, Damaturu                                                     | 2                                                    | 5,7                                                                | Fgn 2009 Budget           | Work In Progress      | Dec 2010                      |

## 5.0 List of medium term technical targets (on a zone by zone basis)

The zonal schedule of projects to address the medium term capability gaps are shown in the tables below. The projects are all expected to be delivered before the end of December 2013.

N.B. In the tables below, the acronyms IGR and NPF (in the “funding source” column) stand, respectively, for “Internally Generated Revenue” and “Not Provided For”.

| ABUJA ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                                        |                                       |                                                |                |          |                    |
|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------|----------------|----------|--------------------|
| S/N                                                          | PROJECTS                                                                                               | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND/ESTIMATED COST OF PROJECTS (₦M) | FUNDING SOURCE | STATUS   | PROJECTED DUE DATE |
| 1                                                            | Installation of 2 x 15MVA at Maikunkule                                                                | 18                                    | 200                                            | NIPP           | On-going | June 2010          |
| 2                                                            | Construction of a new 33KV line 15KM from TS to Maikunkule proposed injection s/s                      |                                       | 67.5                                           | NPF            | New      | Dec. 2013          |
| 3                                                            | Radiate 3Nos 11KV 10 spans each to heat the existing 11KV Feeder                                       |                                       | 7                                              | NPF            | New      | Dec. 2013          |
| 4                                                            | Installation of 2 x 15MVA at field base Suleja                                                         | 24                                    | 140                                            | 2010 Budget    |          | June, 2011         |
| 5                                                            | Construct a 10KM 33KV Feeder from TS to field base Suleja                                              |                                       | 40                                             | 2010 Budget    |          | June, 2011         |
| 6                                                            | Rehabilitation and reconductoring Rafin Sanyi 11KV Feeder                                              |                                       | 16                                             | 2010 Budget    |          | Dec. 2013          |
| 7                                                            | Rehabilitation and reconductoring Madalla 11KV Feeder                                                  |                                       | 14                                             | 2010 Budget    |          | Dec. 2013          |
| 8                                                            | Installation of 2 x 7.5MVA at Zuba                                                                     | 12                                    | 120                                            | NIPP Project   | on-going | June. 20101        |
| 9                                                            | Radiate 2Nos 11KV Feeder from proposed Madalla 2 x 7.5MVA Injection s/s to heat the existing 11kv fdr. |                                       | 8                                              | NPF            |          | June. 20101        |
| 10                                                           | Installation of 2 x 15 MVA at Nyanya                                                                   |                                       | Lump sum                                       | NIPP Project   |          | June. 20101        |

|    |                                                                                                                                                                      |     |      |                     |          |                         |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|---------------------|----------|-------------------------|
| 11 | Create additional 24Nos relief s/s on the existing 11kv fdr                                                                                                          | 24  | 70   | NPF                 | New      | June. 2010 <sup>1</sup> |
| 12 | Installation of 2 x 7.5MVA at Nyanya Gwandara                                                                                                                        | 12  |      | NIPP Project        |          | June, 2011              |
| 13 | Creation of 500KVA, 11/0.415KV T/F 10Nos at Nyanya AND 15Nos at Nyanya Gwandara                                                                                      |     | 80   | NPF                 | New      | June, 2011              |
| 14 | Radiate 3Nos 11KV fdr of 5spans each to heat the existing 11kv fdr at Nyanya proposed injection s/s                                                                  |     | 6    | NPF                 | New      | June, 2011              |
| 15 | Radiate 3Nos 11KV feeder of 5spans each to heat the existing 11kv fdr at Nyanya Gwandara proposed injection s/s                                                      |     | 6    | NPF                 | New      | June, 2011              |
| 16 | Construction of 2 x 15MVA at Wawa                                                                                                                                    | 24  | 199  | 2009 captial budget | on-going | Nov. 2010               |
| 17 | Create 2Nos 11kv outgoing fdr to link the existing 11kv fdr 4km                                                                                                      |     | 14   | NPF                 | new      | Dec. 2013               |
| 18 | create 5nos 500KVA relief s/s                                                                                                                                        |     | 17.5 | NPF                 | new      | Dec. 2013               |
| 19 | Construction of 2 x 15MVA at Agwara                                                                                                                                  | 24  | 199  | 2009 captial budget | on-going | Nov. 2010               |
| 20 | Radiate 2nos 11kv feeders to link the existing 11kv fdr (4KM)                                                                                                        |     | 14   | NPF                 | new      | Dec. 2013               |
| 21 | Create 6nos 500kva, 11/0.415kv s/s                                                                                                                                   |     | 22   | NPF                 | new      | Dec. 2013               |
| 22 | Construct 14km 33kv line to link Wawa 33kv line                                                                                                                      |     | 65   | NPF                 | new      | Dec. 2013               |
| 23 | 2 x 7.5MVA, 33/11KV Inj s/s at Ushafa village and creation of 2Nos 11KV Feeder to feede sss qtrs, Ushafa village, Jifo, War college and Pambare village on 11KV line | 12. | 160M | NPF                 |          | Dec. 2013               |
| 34 | Creation of additional 33kv feeder from 2 x 60MVA 132/33KV AT4 to feede the proposed 2 x 15MVA, 33/11KV Kubwa - 8KM                                                  | 12  | 28.6 | NPF                 |          | Dec. 2013               |
| 35 | Installation of 2 x 15MVA, 33/11KV injection substation at suncity area                                                                                              | 24  | 200m | NPF                 | New      | Dec. 2013               |

|    |                                                                                                                            |    |       |     |     |           |
|----|----------------------------------------------------------------------------------------------------------------------------|----|-------|-----|-----|-----------|
| 36 | Uprating of existing 2.5MVA 33/11KV Inj s/s at Dutse Alhaji to 7.5MVA 33/11KV                                              | 6  | 80    | NPF |     | Dec. 2013 |
| 37 | Creation of additional 2Nos 11KV Feeder from existing 2 x 15MVA Kubwa Inj s/s 8KM each                                     | 6  | 28    | NPF |     | Dec. 2013 |
| 38 | Replacement of faulty 15MVA, 33/11KV power transformer to relief the existing 1No. 15MVA, 33/11KV T/F at K3 Bwari Inj. s/s | 12 | 52m   | NPF |     | Dec. 2013 |
| 39 | Creation of additional 11KV Fdr from the existing 1 x 15MVA, 33/11KV Inj s/s                                               |    | 17.2m | NPF |     | Dec. 2013 |
| 40 | 30Nos relief 50KVA, 11/0.415KV at various places in Bwari                                                                  |    | 105m  | NPF |     | Dec. 2013 |
| 41 | Rehabilitation/Standadization of Idah 33KV Feeder (10km)                                                                   | 4  | 8m    | NPF | New | Dec. 2013 |
| 42 | Installation of 3Nos 500KVA relief substation in Idah Town                                                                 |    | 17.5m | NPF | New | Dec. 2013 |
| 43 | Replacement of weak substation switch gear 10Nos S/S                                                                       |    | 1.5m  | NPF | New | Dec. 2013 |
| 44 | Replacement of bad feeder pillar 10Nos.                                                                                    |    | 2m    | NPF | New | Dec. 2013 |
| 45 | Replacement of bad feeder pillar units 50NOS.                                                                              |    | 1.5m  | NPF | New | Dec. 2013 |
| 46 | Reconductoring of Idah township feeder 7km LT                                                                              |    | 8.4m  | NPF | New | Dec. 2013 |

| BENIN ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                          |                                  |                                           |                |           |                    |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|----------------|-----------|--------------------|
| S/N                                                          | PROJECTS                                                                                 | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE | STATUS    | PROJECTED DUE DATE |
| 1                                                            | Construction of 100km 33kv line & additional 33kv bay at irrua                           | 24                               | 450,000,000.00                            | NPF            | Proposed  | Dec-11             |
|                                                              | Enerhen S/S upgrade from 2x7.5mva to 2 x 15mva,33/11kv s/s with complete accessories     |                                  | 300,000,000.00                            | NPF            | Proposed  | Dec-11             |
|                                                              | Conversion of 8km of 6.6kV network to 11kv: T/F & line                                   |                                  | 150,000,000.00                            | NPF            | Proposed  | Dec-11             |
| 2                                                            | OBIARUKU substation upgrade from 1x7.5mva to 2x7.5mva,33/11kv with complete accessories. | 6                                | 240,000,000.00                            | NPF            | Proposed  | Dec-11             |
| 3                                                            | Installation of additional 15MVA, 33/11kV Injection S/S at Edjeba                        | 12                               | 300,000,000.00                            | NPF            | Proposed  | Dec-11             |
| 4                                                            | Additional 2km, 11kV O/H line                                                            | 4                                | 44,000,000.00                             | NPF            | Proposed  | Dec-11             |
| 5                                                            | Additional 2x15MVA, 33/11kV Injection Substation at PTI                                  | 24                               | 200,000,000.00                            | NPF            | Proposed  | Dec-11             |
| 6                                                            | Construction of 14km PTI fdr from Effurun TS                                             | 8                                | 56,000,000.00                             |                | Proposed  | Dec-11             |
| 7                                                            | Reconductoring of 4km of L.T. O/H network                                                | 3                                | 5,824,000.00                              | NPF            | Proposed  | Dec-11             |
| 8                                                            | Construction of 1x 15MVA, 33/11KV Injection S/S at Oke aro                               | 12                               | Lump sum                                  | NIPP           | 15% Comp. | Dec. 2011          |
| 9                                                            | Construction of 1x15MVA, 33/11KV Injection S/S at Akure                                  | 12                               | Lump sum                                  | NIPP           | ditto     | Dec. 2011          |
| 10                                                           | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ore                                   | 6                                | Lump sum                                  | NIPP           | ditto     | Dec. 2011          |

|    |                                                                  |    |          |      |          |           |
|----|------------------------------------------------------------------|----|----------|------|----------|-----------|
| 11 | Construction of 1x15MVA, 33/11KV Injection S/S at Ado Ekekiti    | 12 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 12 | Construction of 1x 7.5 MVA, 33/11KV Injection S/S at Ijero Ekiti | 6  | Lump sum | NIPP | ditto    | Dec. 2011 |
| 13 | Construction of 1x7.5 MVA, 33/11KV Injection S/S at Oye Ekiti    | 6. | Lump sum | NIPP | ditto    | Dec. 2011 |
| 14 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ise Ekiti     | 6  | Lump sum | NIPP | 15% Comp | Dec. 2011 |
| 15 | Construction of 1x 7.5 MVA, 33/11KV Injection S/S at Igede Ekiti | 6  | Lump sum | NIPP | ditto    | Dec. 2011 |
| 16 | Construction of 1x7.5 MVA, 33/11KV Injection S/S at Omotosho     | 6. | Lump sum | NIPP | ditto    | Dec. 2011 |
| 17 | Construction of 2x 2.5MVA, 33/11KV Injection S/S at Ihorbor      | 4  | Lump sum | NIPP | 3% Comp. | Dec. 2011 |
| 18 | Construction of 1x15MVA, 33/11KV Injection S/S at Oluku          | 12 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 19 | Construction of 1x15MVA, 33/11KV Injection S/S at Guinness       | 12 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 20 | Construction of 1x 15MVA, 33/11KV Injection S/S at Igbomo        | 12 | Lump sum | NIPP | 3% Comp. | Dec. 2011 |
| 21 | Construction of 1x15MVA, 33/11KV Injection S/S at Iyekoba        | 12 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 22 | Construction of 1x15MVA, 33/11KV Injection S/S at Sakponba       | 12 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 23 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ukpella       | 6  | Lump sum | NIPP | 2% Comp  | Dec. 2011 |
| 24 | Construction of 1x 7.5 MVA, 33/11KV Injection S/S at Igara       | 6  | Lump sum | NIPP | ditto    | Dec. 2011 |
| 25 | Construction of 2x15 MVA, 33/11KV Injection S/S at Ekpoma        | 24 | Lump sum | NIPP | ditto    | Dec. 2011 |
| 26 | Construction of 1x 7.5MVA, 33/11KV                               | 6  | Lump sum | NIPP | 2% Comp. | Dec. 2011 |

|    |                                                                                                                  |    |          |             |                    |           |
|----|------------------------------------------------------------------------------------------------------------------|----|----------|-------------|--------------------|-----------|
|    | Injection S/S at Aganebode                                                                                       |    |          |             |                    |           |
| 27 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Afuze                                                         | 6  | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 28 | Construction of 1x15MVA, 33/11KV Injection S/S at Auchi                                                          | 12 | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 29 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Abraka                                                        | 6  | Lump sum | NIPP        | 8% Comp            | Dec. 2011 |
| 30 | Construction of 1x 7.5 MVA, 33/11KV Injection S/S at Ovwor                                                       | 6  | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 31 | Construction of 1x15 MVA, 33/11KV Injection S/S at Eket                                                          | 12 | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 32 | Construction of 1x 7.5MVA, 33/11KV Injection S/S at Otorwodo                                                     | 6  | Lump sum | NIPP        | 8% Comp.           | Dec. 2011 |
| 33 | Construction of 1x7.5MVA, 33/11KV Injection S/S at Ughelli                                                       | 6  | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 34 | Construction of 1x15MVA, 33/11KV Injection S/S at Oleh                                                           | 12 | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 35 | Construction of 1x 15 MVA, 33/11KV Injection S/S at Ogorede                                                      | 12 | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 36 | Construction of 1x15 MVA, 33/11KV Injection S/S at Amukpe                                                        | 12 | Lump sum | NIPP        | ditto              | Dec. 2011 |
| 37 | Construction of 15MVA, 33/11KV Injection Substation at Ighuosa                                                   | 12 | 80       | 2010 Budget | Proc. in progress. | Dec. 2011 |
| 38 | Construction of 15MVA 33/11KV Injection Substation at Auchi Road, Ikpoba Okha                                    | 12 | 67       | ditto       | ditto              | Dec. 2011 |
| 39 | Construction of 15MVA 33/11KV Injection Substation for Egor                                                      | 12 | 40       | ditto       | ditto              | Dec. 2011 |
| 40 | Construction of 4.5KM 33KVA Line and Installation of 1x7.5MVA, 33/11KV Injection Substation at Alagbaka Quarters | 6  | 139.5    | ditto       | ditto              | Dec. 2011 |

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|    |                                                                                                      |   |     |       |       |           |
|----|------------------------------------------------------------------------------------------------------|---|-----|-------|-------|-----------|
| 41 | Procurement and Installation of 1x7.5MVA Injection Substation at Opoji, Esan Central LGA, Edo State) | 6 | 150 | ditto | ditto | Dec. 2011 |
|----|------------------------------------------------------------------------------------------------------|---|-----|-------|-------|-----------|

| <b>EKO ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets)</b> |                                                                                                                                   |                                         |                                                  |                       |                |                           |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|--------------------------------------------------|-----------------------|----------------|---------------------------|
| <b>S/N</b>                                                        | <b>PROJECTS</b>                                                                                                                   | <b>CONTRIBUTION TOWARDS GAP CLOSURE</b> | <b>ALLOCATED FUND/ESTIMATED COST OF PROJECTS</b> | <b>FUNDING SOURCE</b> | <b>STATUS</b>  | <b>PROJECTED DUE DATE</b> |
| 1                                                                 | Installation of a 2nd 15MVA 33/11kV Trf @ Orile Coker S/S                                                                         | 12                                      | Lump sum                                         | NIPP                  | on-going       | Jun, 2011                 |
| 2                                                                 | Installation of 3rd 15MVA 33/11kV Transf. @ Kirikiri S/S with Rehabilitation of S/Station & Flood control Civil work construction | 12                                      | Lump sum                                         | NIPP                  | on-going       | Jun, 2011                 |
| 3                                                                 | construction of express 40km 33kV o/H line from Aja T/S to Ibeju Lekki is proposed                                                | 20                                      | 360m                                             | NPF                   | Newly proposed | Dec. 2010                 |
| 4                                                                 | Construction of Elemoro 1x15 MVA inj. Substation                                                                                  |                                         | Lump sum                                         | NIPP                  | on-going       | Dec. 2010                 |
| 5                                                                 | Construction of Ibeju Lekki 1x15 MVA inj. Substation                                                                              |                                         | Lump sum                                         | NIPP                  | on-going       | Dec. 2010                 |
| 6                                                                 | Installation of additional 15MVA Transf @ Ojo Local                                                                               | 8.8                                     | Lump sum                                         | NIPP                  | on-going       | Dec. 2010                 |
| 7                                                                 | construction 100m of 33kV Feeder with 2x185mm <sup>2</sup> x1core XLPE Cable to feed the new 15MVA Trf @ Ojo Local S/S            |                                         | Lump sum                                         | NIPP                  | on-going       | Dec. 2013                 |
| 8                                                                 | Const. of additional 12km Festac III 33kV D/circuit line from Ojo T/S to Festac                                                   | 12                                      | 120m                                             | NPF                   | Newly proposed | Dec. 2013                 |
| 9                                                                 | construction of Festac 4th Avenue 2x15MVA 33/11kV S/S                                                                             | 24                                      | Lump sum                                         | NIPP Funded           | on-going       | Dec. 2010                 |
| 10                                                                | Const. of 2No. 33kV U/G Feeders from Isolo T/S to Isolo inj. S/S                                                                  |                                         | Lump sum                                         | NIPP                  | on-going       | Dec. 2010                 |
| 11                                                                | construction of 3x15MVA 33/11kV inj. S/S at Isolo Local.                                                                          |                                         |                                                  |                       |                | Dec. 2013                 |
| 12                                                                | Installation of additional 15MVA Transf @ Ajangbadi inj. S/S                                                                      | 20                                      | Lump sum                                         | NIPP                  | on-going       | Jun 2011                  |
| 13                                                                | Construction of Iba Lasu 1x15 MVA inj. Substation                                                                                 |                                         | Lump sum                                         | NIPP                  | on-going       | Jun 2011                  |
| 14                                                                | Const. of Ojo -Alaba 1.5km 33kV Fdr (partly) UnderGround                                                                          |                                         | 25m                                              | NPF                   | Newly proposed | Dec. 2013                 |
| 15                                                                | Construction of Alaba Int'l 1x15MVA 33/11kV inj. S/S                                                                              |                                         | NIPP Funded                                      | NIPP Funded           | on-going       | Jun 2011                  |
| 16                                                                | Replacement of 1No. 7.5MVA 33/11kV Trf with 15MVA 33/11kV Trf at Tin Can S/S                                                      | 5.4                                     | Lump sum                                         | NIPP                  | on-going       | Jun. 2011                 |
| 17                                                                | Replacement of old 11kV switch gears at Tin Can S/S                                                                               |                                         |                                                  |                       |                | Dec. 2013                 |
| 18                                                                | rehabilitation of Apapa Rd.- Tin Can 33kV U/G Fdr is proposed                                                                     |                                         | 181.82                                           | NPF                   | Newly proposed | Dec. 2013                 |

|    |                                                                                                                                                                                                                                |     |          |             |                |           |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------|-------------|----------------|-----------|
| 19 | construction of 2.5km of 11kV line to relief O/Loaded Beachland Feeder                                                                                                                                                         |     | 11.25    | NPF         | Newly Proposed | Dec. 2013 |
| 20 | Installation of 15MVA 33/11kV 2nd Transf. @ Agbara Local Mains S/S                                                                                                                                                             | 9.9 | Lump sum | NIPP Funded | on-going       | Jun. 2011 |
| 21 | Installation of 15MVA 33/11kV 2nd Transf. @ Apapa Rd Local S/S                                                                                                                                                                 | 20  | Lump Sum | NIPP        | on-going       | June 2011 |
| 22 | Proposed installation of 1x15MVA 33/11kV Trf (to replace the lost 15MVA Mobitra) @ Apapa Rd Txm.                                                                                                                               |     | 120m     | FGN         | Newly proposed | Dec. 2013 |
| 23 | Replacenet of old Panels @Apapa Rd Local                                                                                                                                                                                       |     | Lump Sum | NIPP        | on-going       | June 2011 |
| 24 | NIPP is to construct additional U/G fdr to New idumagbo S/S                                                                                                                                                                    | 3.2 |          | NIPP Funded | on-going       | Jun 2011  |
| 25 | Installation of 2nd 15MVA 33/11kV additional Transf. @ New Idumagbo S/S                                                                                                                                                        |     |          | NIPP Funded | on-going       | Dec. 2013 |
| 26 | Replacement of 33kV & 11kV swich Gears                                                                                                                                                                                         |     |          | NIPP Funded | on-going       | Dec. 2013 |
| 27 | construction of 11kV U/G Cable Fdrs: 2km to relief Oba Fdr, & installation of 3No. 500kVA trf; 2km to relief Adeniyi; and 1.5km to relief Dolphin and 3No RMUs                                                                 |     |          | NIPP Funded |                | Jun 2011  |
| 28 | rehabilitation of Ademola-Anifowoshe 33kV U/G Cable interconnector (6.84km) is proposed                                                                                                                                        | 28  | 19.2m    | NPF         | Newly proposed | Jun, 2011 |
| 29 | Replacement of old Reyrolle 33kV switch Gears (10No) @ Anifowoshe S/S                                                                                                                                                          |     |          | NPF         | Newly proposed | Jun, 2011 |
| 30 | Replacement of Failed 15MVA 33/11kV Transf.@Anifowoshe inj. S/S                                                                                                                                                                |     |          | NPF         |                | Jun, 2011 |
| 31 | construction of 5No. 11kV Relief Fdrs: Adeleke Fdr 2.2km; Paliament Fdr 2.7km; Fed. Palace Fdr 2.3km; Maroko Fdr 2.7 km ; & Ozumba Fdr 3km. And Installation of 10No.sets of RMU, 12No. 11/0.415 Transf and 9No.Feeder Fillars |     | 280m     | NPF         | Newly proposed | Jun, 2011 |
| 32 | Installation of 3rd 15MVA 33/11kV @Nitel inj. Sub Station                                                                                                                                                                      | 12  |          | NPF         |                | Jun, 2011 |
| 33 | Installation of 4No. 500kVA relief Transformers at Nitel S/S                                                                                                                                                                   |     |          | NPF         |                | Jun, 2011 |
| 34 | Constuction of 33kV OverHead 2.8km from Ilupeju T/S to Nitel inj. S/Station                                                                                                                                                    |     | 18m      | NPF         | Newly proposed | Jun, 2011 |

|    |                                                                                                                                         |    |      |     |                |           |
|----|-----------------------------------------------------------------------------------------------------------------------------------------|----|------|-----|----------------|-----------|
| 35 | construction of 1.5km 33kV U/G interconnector between Luth & Idi Araba inj. S/Stations                                                  | 18 | 48 M | NPF | newly proposed | Jun, 2011 |
| 36 | upgrading of 3No 300kVA Transf S/S to 500kVA on papa Ajao 11kV Feeder, Installation of 2No 500kVA on Babalola Feeder.                   |    |      |     |                |           |
| 37 | construction of 3.5km 11kV relief to Ogunlana Fdr; Installation of 500kVA relief Transf on Okoh 11kV Fdr at <b>LUTH INJ. S/Station.</b> |    |      | NPF | newly proposed | Jun, 2011 |

| ENUGU ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                                     |                                        |                                                 |                        |          |                       |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------|------------------------|----------|-----------------------|
| S/N                                                          | PROJECTS                                                                                            | CONTRIBUTION<br>TOWARDS GAP<br>CLOSURE | ALLOCATED<br>FUND/ESTIMATED<br>COST OF PROJECTS | FUNDING SOURCE         | STATUS   | PROJECTED<br>DUE DATE |
| 1                                                            | Proposed Construction of 15km Afara 33KV Feeder from Ohiya 132/33KV TS Umuahia (nearing completion) | 11.5                                   | 54,526,320                                      | NPF                    | New      | Dec. 2013             |
| 2                                                            | Omoba Town 1x7.5MVA 33/11KV Inj S/S                                                                 |                                        | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 3                                                            | Uprating of 7.5MVA 33/11KV T/F to 15MVA at Afara Inj S/S Umuahia                                    |                                        | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 4                                                            | Olokoru 1x15MVA 33/11KV Inj S/S                                                                     |                                        | 400,000,000                                     | 2009 & 2010 FGN Budget | On-going | Dec. 2013             |
| 5                                                            | Umudike 1x15MVA 33/11KV Inj S/S                                                                     |                                        |                                                 | 2010 FGN Budget        | On-going | Dec. 2013             |
| 6                                                            | Afikpo 1 x 7.5MVA 33/11KV Inj S/S                                                                   | 2.55                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 7                                                            | Reconstruction/re-routing of Afikpo 33KV Feeder up to Owutu Edda - 100km                            |                                        | 295,000,000                                     | NIPP                   | New      | Dec. 2013             |
| 8                                                            | Ekwulobia 7.5MVA 33/11KV Inj. S/S                                                                   | 2.40                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 9                                                            | Nri 7.5MVA 33/11KV Inj S/S                                                                          | 5.90                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 10                                                           | Trade Fair Complex 1x7.5MVA 33/11KV Inj S/S Enugu                                                   | 5.60                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 11                                                           | Eke 2x2.5MVA 33/11KV Inj S/S                                                                        | 4                                      | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 12                                                           | Uprating of Emene 1x7.5MVA to 15MVA 33/11KV Inj S/S                                                 | 6.00                                   | Lump sum                                        | NIPP                   | On-going | Dec. 2013             |
| 13                                                           | Amaechi 1x7.5MVA 33/11KV Inj S/S                                                                    | 5.90                                   | Lump sum                                        | NIPP                   | On-going | Dec. 2013             |
| 14                                                           | Trans Ekulu 1x7.5MVA 33/11KV Inj S/S                                                                | 3.10                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 15                                                           | New Haven TS 1x7.5MVA 33/11KV Inj S/S                                                               | 3.94                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 16                                                           | Loma Linda 1x7.5MVA 33/11KV Inj S/S                                                                 | 3.10                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |
| 17                                                           | * Army Barracks 2nd 15MVA 33/11kv Inj. S/S, Onitsha [same                                           | 3.00                                   | Lump Sum                                        | NIPP                   | On-going | Dec. 2013             |

|    | as one above]                                                                            |      |             |      |          |           |
|----|------------------------------------------------------------------------------------------|------|-------------|------|----------|-----------|
| 18 | Azaraegbelu 1x7.5MVA 33/11kv Inj. S/S                                                    | 2.05 | Lump        | NIPP | On-going | Dec. 2013 |
| 19 | Mgbidi 1x7.5MVA 33/11KV Inj S/S                                                          | 5    | Lump sum    | NIPP | On-going | Dec. 2013 |
| 20 | Proposed 2.2km Egbema 33KV Feeder from Egbema Power Station 132/33KV TS                  |      | Lump sum    | NIPP | On-going | Dec. 2013 |
| 21 | Egbema 1x7.5MVA 33/11KV Inj S/S                                                          | 4.8  | Lump sum    | NIPP | On-going | Dec. 2013 |
| 22 | Rehabilitation/reconductoring of 10km dilapidated sections of Ariaria 11KV line          | 20.6 | 20,000,000  | NPF  | New      | Dec. 2013 |
|    | Rehabilitation/reconductoring of 10km 0.415KV line                                       |      | 20,000,000  | NPF  | New      | Dec. 2013 |
| 23 | Rehabilitation/reconductoring of 25km 0.415KV line                                       | 18.3 | 42,550,000  | NPF  | New      | Dec. 2013 |
| 24 | Rehabilitation/reconductoring of 25km 0.415KV line                                       | 2.6  | 42,550,000  | NPF  | New      | Dec. 2013 |
| 25 | Rehabilitation/reconductoring of 10km 0.415KV line                                       | 2.4  | 25,198,830  | NPF  | New      | Dec. 2013 |
| 26 | Rehabilitation/reconductoring of 10km 0.415KV line                                       | 2.1  | 25,198,830  | NPF  | New      | Dec. 2013 |
| 27 | 1 x 15MVA S/S, Abagana, Awka                                                             | 15.0 | 143,179,901 | NPF  | New      | Dec. 2013 |
| 28 | Rehabilitation/reconductoring of 8km dilapidated sections of Azuiyiokwu 11KV line        | 6.8  | 16,000,000  | NPF  | New      | Dec. 2013 |
| 29 | Rehabilitation/reconductoring of 25km 0.415KV line                                       | 0.5  | 42,550,000  | NPF  | New      | Dec. 2013 |
| 30 | Construction of 10x300KVA 11/0.415KV Relief S/S                                          | 9.0  | 39,911,520  | NPF  | New      | Dec. 2013 |
| 31 | Rehabilitation/reconductoring of 30km dilapidated sections of Ezeagu 33KV line up to Olo | 20   | 67,500,000  | NPF  | New      | Dec. 2013 |
| 32 | Rehabilitation/reconductoring of 4km dilapidated sections of Gariki 11KV line            | 6.7  | 8,000,000   | NPF  | New      | Dec. 2013 |
| 33 | Rehabilitation/reconductoring of 6km dilapidated sections of Abakpa II 11KV line         | 15.3 | 12,000,000  | NPF  | New      | Dec. 2013 |

|    |                                                                                        |      |            |     |     |           |
|----|----------------------------------------------------------------------------------------|------|------------|-----|-----|-----------|
| 34 | Rehabilitation/reconductoring of 6km dilapidated sections of New Haven 11KV line       | 9.2  | 12,000,000 | NPF | New | Dec. 2013 |
| 35 | Rehabilitation/reconductoring of 4km dilapidated sections of Nsukka Township 11KV line | 12.2 | 8,000,000  | NPF | New | Dec. 2013 |
| 36 | Rehabilitation/reconductoring of 10km dilapidated sections of Atani 33KV line          | 13.3 | 22,500,000 | NPF | New | Dec. 2013 |
| 37 | Rehabilitation/reconductoring of 3km dilapidated sections of Minaj 11KV line           | 5.1  | 6,000,000  | NPF | New | Dec. 2013 |
| 38 | Rehabilitation/reconductoring of 6km Aba O/H 33KV line                                 | 17.9 | 13,500,000 | NPF | New | Dec. 2013 |
| 39 | Rehabilitation/reconductoring of 10km dilapidated sections of FUT 11KV line            | 3.9  | 20,000,000 | NPF | New | Dec. 2013 |
| 40 | Rehabilitation/reconductoring of 30km dilapidated sections of Okigwe 33KV line         | 14.5 | 67,500,000 | NPF | New | Dec. 2013 |
| 41 | Rehabilitation/reconductoring of 6km dilapidated sections of Orlu Feeder I 11KV line   | 4.8  | 12,000,000 | NPF | New | Dec. 2013 |

| IBADAN ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                                                           |                                  |                                           |                |                |                    |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|----------------|----------------|--------------------|
| S/NO                                                          | PROJECTS                                                                                                                  | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE | STATUS         | PROJECTED DUE DATE |
| 1                                                             | 1x 15MVA, 33/11KV APETE INJ S/S                                                                                           | 12                               | 200,000,000.00                            | NIPP           | Ongoing        | Dec 11             |
|                                                               | Replacement of 9x500KVA, 1x315KVA, 6x300KVA, 4x200KVA and 1x100KVA (existing 33/0.415KV TF by the 11/0.415KV T/F)         |                                  | 60,000,000.00                             | NIPP           |                |                    |
|                                                               | 1No In & Out 33KV Breaker at Eleyele inj. S/S for Apete 33kv fdr                                                          |                                  | 7,500,000.00                              | NPF            | Proposed       | Dec 2011           |
| 2                                                             | (i)Eruwa 1x7.5MVA, 33/11KV INJ S/S                                                                                        | 6                                | Lump sum                                  | NIPP           | 5% Completion  | Dec. 2011          |
| 3                                                             | 7.5MVA 33/11KV AWE INJ S/S                                                                                                | 6                                | Lump sum                                  | NIPP           | 0% Completion  | Dec. 2011          |
| 4                                                             | Upgrade of 2.5MVA 33/11KV at Epe to 1X7.5MVA, 33/11KV INJ S/S at Ososa                                                    | 6                                | Lump sum                                  | NIPP           | 20% Completion | Dec. 2011          |
| 5                                                             | (i) OJOKU OFFA 1X15MVA, 33/11KV INJ S/S<br>(ii) OKUKU 1X7.5MVA, 33/11KV INJ S/S                                           | 12                               | Lump sum                                  | NIPP           | 0% Completion  | Dec. 2011          |
| 6                                                             | 1X15MVA, 33/11KV INJ S/S at Ilesa                                                                                         | 12                               | Lump sum                                  | NIPP           |                | Dec. 2011          |
| 7                                                             | ORITA 1x15MVA 33/11 INJ S/S                                                                                               | 12                               | Lump sum                                  | NIPP           | On going       | Dec 2011           |
| 8                                                             | Extension of 20km route length of 33kv line to pick the proposed 1x15MVA 33/11 KV INJ S/S and 15km extension of 11kv line |                                  | 150,000,000.00                            | NPF            | Proposed       | Dec 2011           |
| 9                                                             | Installation of 15 No 500KVA 11/0.415KV distribution transformers with all accessories                                    |                                  | 75,000,000.00                             | NPF            | Proposed       |                    |
| 10                                                            | Pipeline/Agba Dam 2X15MVA, 33/11KV S/S                                                                                    | 24                               | 400,000,000.00                            | NIPP           | 30% Completion | June 2011          |
| 11                                                            | TINUMOLA 1x7.5MVA, 33/11KV INJ S/S                                                                                        | 6                                | Lump sum                                  | NIPP           | 20% Completion | June 2011          |
| 12                                                            | Construction of 37.9km of Ijoko 11kv feeders                                                                              | 2.95                             | 151,600,000.00                            | NPF            | Newly Proposed | Dec 2011           |
| 13                                                            | Construction of 2x15MVA 33/11KV S/S at Ijoko                                                                              |                                  | Lump Sum                                  | NIPP           | 5% Completion  | Dec 2011           |
| 14                                                            | Construction of 1x15MVA 33/11KV S/S at Olomore                                                                            | 12                               | Lump Sum                                  | NIPP           | Newly Proposed | Dec 2011           |
| 15                                                            | Construction of 37.9km of Idiroko 11kv feeders                                                                            | 12                               | 151,600,000.00                            | NPF            | Newly Proposed | Dec 2011           |
| 16                                                            | 1x15MVA 33/11KV S/S at Owode Yewa                                                                                         |                                  | Lump Sum                                  | NIPP           | 5% Completion  |                    |
| 17                                                            | Construction of 1x15MVA 33/11KV S/S at Ado Odo-Ota                                                                        | 12                               | Lump Sum                                  | NIPP           | 0%             | Dec 2011           |
| 18                                                            | Construction of 1x15MVA 33/11KV S/S at Itele                                                                              | 12                               | Lump Sum                                  | NIPP           | 0%             | Dec 2011           |

|    |                                                                                 |    |                |      |                |          |
|----|---------------------------------------------------------------------------------|----|----------------|------|----------------|----------|
| 19 | Akobo 1X 15 MVA, 33/11KV INJ S/S                                                | 12 | Lump Sum       | NIPP | 5% Comp.       | Dec 2011 |
| 20 | SAMONDA 1X 15 MVA, 33/11KV INJ S/S                                              | 12 | Lump Sum       | NIPP | 5% Comp.       | Dec 2011 |
| 21 | 1X15MVA 33/11KV INJ S/Sat Ile-Ife                                               | 12 | 200,000,000.00 | NPF  | Newly proposed | Dec 2011 |
| 22 | Extension of the 33KV feeder by 10km and installation of 1x15MVA 33/11KV S/S    |    | 50,000,000.00  |      |                |          |
| 23 | 1X15MVA 33/11KV INJ S/S at Moniya                                               | 12 | Lump Sum       | NIPP | 5% Comp.       | Dec 2011 |
| 24 | Construction of 2x15MVA 33/11KV S/S at Okeho                                    | 24 | 400,000,000.00 | NPF  | Newly Proposed | Dec 2011 |
| 25 | Extension of 10km route length of 33/11KV lines to pick the 2x15MVA 33/11KV T/F |    | 45,000,000.00  |      |                |          |
| 26 | Replacement of 30No 33/0.415KV T/F with 11/0.415KV type                         |    | 150,000,000.00 |      |                |          |

| IKEJA ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                        |                                  |                                           |                |                 |                    |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|----------------|-----------------|--------------------|
| S/N                                                          | PROJECTS                                                                               | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE | STATUS          | PROJECTED DUE DATE |
| 1                                                            | Upgrading of 1 7.5MVA at Epe Inj.                                                      | 20                               | Lump Sum                                  | NIPP           | Ongoing         | Dec 2011           |
| 2                                                            | Proposed 1 1.5MVA NIPP project Imota                                                   |                                  | Lump Sum                                  | NIPP           | Ongoing         | Dec 2011           |
| 3                                                            | Proposed 1 1.5MVA NIPP project Agbowo                                                  |                                  | Lump Sum                                  | NIPP           | Ongoing         | Dec 2011           |
| 4                                                            | Construction and installation of 5 Nos 11KV feeders                                    |                                  | 10,193,830                                | NPF            | Yet to commence | Dec 2011           |
| 5                                                            | Construction and installation of 60 Nos 500KVA transformer                             |                                  | 378,852,120                               | NPF            | DITTO           | Dec 2011           |
| 6                                                            | Construction of 40km route length of L. T reticulation                                 |                                  | 81,550,640                                | NPF            | DITTO           | Dec 2011           |
| 7                                                            | Reconstruction of 68km route length of Agbowo 33KV feeder                              |                                  | 154,668,200                               | NPF            | DITTO           | Dec 2011           |
| 8                                                            | Replacement of 2 sets of obsolete 11kv panels.                                         | 10.82                            | 57,600,000                                | NPF            | DITTO           | Dec 2011           |
| 9                                                            | Proposed 1 15MVA NIPP project at Owotu inj. s/s                                        |                                  | -Lump sum                                 | NIPP           | Ongoing         | Dec 2011           |
| 10                                                           | Construction and installation of 30no 500KVA transformer to relief the overloaded ones |                                  | 189,426,060                               | NPF            | Yet to commence | Dec 2011           |
| 11                                                           | Construction of 20km route length of 2 Nos 11KV feeder and 1 set of 11KV breaker panel |                                  | 69,575,120                                | NPF            | DITTO           | Dec 2011           |
| 12                                                           | Construction of 100km route length of L. V. reticulation                               |                                  | 203,876,600                               | NPF            | DITTO           | Dec 2011           |
| 13                                                           | Construction and installation of 60 Nos 500KVA relief transformers                     |                                  | 380,000,000                               | NPF            | DITTO           | Dec 2011           |
| 14                                                           | Reconductoring and rehabilitation of 200KM route length of LV reticulation             |                                  | 950,000,000                               | NPF            | DITTO           | Dec 2011           |
| 15                                                           | Proposed 1 15MVA NIPP project at Ipakodo inj. s/s and 1 15MVA at Ajegunle              |                                  | Lump sum                                  | NIPP           | 25%             | Dec 2011           |

|    |                                                                                              |     |               |      |                 |          |
|----|----------------------------------------------------------------------------------------------|-----|---------------|------|-----------------|----------|
| 16 | Construction and installation of 40 Nos 500KVA transformer                                   | 13  | 252,568,080   | NPF  | Yet to commence | Dec 2011 |
| 17 | Construction of 2 Nos 11KV feeder (20km)                                                     |     | 40,775,320    | NPF  | DITTO           | Dec 2011 |
| 18 | Reconstruction of 50km route length of L.V reticulation                                      |     | 101,938,300   | NPF  | DITTO           | Dec 2011 |
| 19 | Reconstruction of 12km portion of Ibeshe 33KV feeders                                        |     | 54,000,000    | NPF  | DITTO           | Dec 2011 |
| 20 | 1 x15MVA each for Akute and Lambe                                                            | 24  | Lump sum-     | NIPP | On-going        | Dec 2011 |
| 21 | 1 x 15MVA 33/11kv inj. S/S at Air Force Sasha                                                | 8.0 | Lump sum-     | NIPP | On-going        | Dec 2011 |
| 22 | 1 x 15MVA 33/11kv inj. S/S at Ogba Ijaye                                                     | 12  | Lump sum-     | NIPP | On-going        | Dec 2011 |
| 23 | 1 x 15MVA 33/11kv inj. S/S at Agidigbi                                                       | 12  | Lump sum-     | NIPP | On-going        | Dec 2011 |
| 24 | 2 x 15MVA 33/11kv inj. S/S at Igboogbo                                                       | 24  | Lump sum-     | NIPP | On-going        | Dec 2011 |
| 25 | Proposed Ogudu 1x15MVA (NIPP)                                                                | 9.9 | Lump sum-     | NIPP | Ongoing         | Dec 2011 |
| 26 | Replacement of 2 sets of obsolet 11kv breaker panels at Ogudu inj. substation                |     | 57,600,000    | NPF  | Yet to commence | Dec 2011 |
| 27 | Proposed Maryland/Ogudu 33kv fdr to pick the new station                                     |     | 14,911,351.22 | NPF  | DITTO           | Dec 2011 |
| 28 | Construction of Victoria outgoin 11kv feeder to take care of over loaded express 11kv fdr    |     | 20,387,000    | NPF  | DITTO           | Dec 2011 |
| 29 | Construction of 2 No outgoing 11KV fdrs to evacuate the load                                 | 12  | 40,774,000    | NPF  | DITTO           | Dec 2011 |
| 30 | Proposed on-going 1x15MVA NIPP project at Ope-Ilu                                            |     | Lump Sum      | NIPP | Ongoing         | Dec 2011 |
| 31 | Construction of 15 500KVA relief                                                             |     | 94,713,042    | NPF  | Yet to commence | Dec 2011 |
| 32 | Reconstruction and reconductoring of 20km of route length of L.T recticulation               |     | 9,032,595     | NPF  | DITTO           | Dec 2011 |
| 33 | Construction of 2 Nos 11KV feeder (20km)                                                     | 10  | 40,775,320    | NPF  | DITTO           | Dec 2011 |
| 34 | Reconstruction of 60km of Fakale 33KV feeder Ex – Ikorodu Tx                                 |     | 107,908,046   | NPF  | DITTO           | Jun-11   |
| 35 | Reconstruction of 50km route length of L.V. reticulation                                     |     | 101,938,300   | NPF  | DITTO           | Jun-11   |
| 36 | Proposed 1 15KVA substation at Odogunyam s/s                                                 |     | 150,000,000   | NPF  | DITTO           | Jun-11   |
| 37 | Construction and installation of 30 Nos of 500KVA transformer to relieve the overloaded ones | 9.3 | 189,426,060   | NPF  | DITTO           | Apr-11   |
| 38 | Construction of 20km route length of 2 Nos 11KV feeders                                      |     | 40,775,320    | NPF  | DITTO           | Apr-11   |
| 39 | Construction of 100km route length of L. V reticulation                                      |     | 203,876,600   | NPF  | DITTO           | Apr-11   |

|    |                                                                                        |        |             |      |                 |          |
|----|----------------------------------------------------------------------------------------|--------|-------------|------|-----------------|----------|
| 40 | Proposed 2 15MVA NIPP project at Igbogbo and Imota                                     |        | 189,426,060 | NIPP | DITTO           | Apr-11   |
| 41 | Proposed Alaja 1 7.5MVA transformer                                                    | 13     | -           | IGR  | DITTO           | Dec 2010 |
| 42 | Proposed installation of 1 15MVA and 1 set of 11KV panel at Ayobo inj. s/s             |        | 150,000,000 | NPF  | DITTO           | March 11 |
| 43 | Construction and installation of 20 Nos 500KVA relief substation                       |        | 126,284,055 | NPF  | DITTO           | March 11 |
| 44 | Reconductoring and rehabilitation of 70km route length of L.V. reticulation            |        | 32,650,350  | NPF  | DITTO           | March 11 |
| 45 | Replacement of obsolete 3 sets of 11KVA panel                                          | 12.5MW | 87,900,000  | NPF  | Yet to commence | Dec 2011 |
| 46 | Proposed 15km of 33KVA feeder and installation 1 x 15MVA transformer at Agege inj. s/s |        | 150,000,000 | NPF  | Yet to commence | Dec 2011 |
| 47 | Construction of 3 Nos 11KV feeder and 1 set of 11KVA panel                             |        | 99,865,520  | NPF  | Yet to commence | Dec 2011 |
| 48 | Installation of 20 No 500KVA relief transformer                                        |        | 128,284,055 | NPF  | Yet to commence | Dec 2011 |
| 49 | Reconstruction and reconductoring of 70km of L. V reticulation                         |        | 32,650,350  | NPF  | Yet to commence | Dec 2011 |
| 50 | 1 x 15MVA 33/11kv inj. S/S at Ijede                                                    | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 51 | 1 x 15MVA 33/11kv inj. S/S at Agboyiwa                                                 | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 52 | 1 x 15MVA 33/11kv inj. S/S at Ejigbo                                                   | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 53 | 1 x 15MVA 33/11kv inj. S/S at Mafoloku                                                 | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 54 | 1 x 15MVA 33/11kv inj. S/S at Isolo Industrial Area                                    | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 55 | 1 x 15MVA 33/11kv inj. S/S at New Oworo                                                | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 56 | 1 x 15MVA 33/11kv inj. S/S at Maryland/Mende                                           | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 57 | 1 x 15MVA 33/11kv inj. S/S at Mushin                                                   | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 58 | 1 x 15MVA 33/11kv inj. S/S at Abule Oja/Military                                       | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |
| 59 | 1 x 15MVA 33/11kv inj. S/S at Isolo Abule Oki                                          | 12     | Lump sum-   | NIPP | On-going        | Dec 2011 |

| <b>JOS ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets)</b> |                                                                                                                             |                                                      |                                                                   |                           |               |                               |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------|---------------------------|---------------|-------------------------------|
| <b>S/N</b>                                                        | <b>PROJECTS</b>                                                                                                             | <b>CONTRIBUTION<br/>TOWARDS GAP<br/>CLOSURE (MW)</b> | <b>ALLOCATED<br/>FUND/ESTIMATED<br/>COST OF PROJECTS<br/>(MN)</b> | <b>FUNDING<br/>SOURCE</b> | <b>STATUS</b> | <b>PROJECTED<br/>DUE DATE</b> |
| 1                                                                 | Const. of 1x7.5MVA, 33/11KV Inj. S/S at Wase, Plateau South Biz. Unit                                                       | 6                                                    | Lump sum                                                          | NIPP                      | Ongoing       | Jun, 2011                     |
| 2                                                                 | Const. of 1x7.5MVA, 33/11KV Inj. S/S at Pankshini, Plateau South Buz. Unit.                                                 | 6                                                    | Lump sum                                                          | NIPP                      | Ongoing       | Jun, 2011                     |
| 3                                                                 | Const. of 1x7.5MVA, 33/11KV Inj. S/S at Langtang, Plateau South Biz. Unit.                                                  | 6                                                    | Lump sum                                                          | NIPP                      | Ongoing       | Jun, 2011                     |
| 4                                                                 | Const. of 1x7.5MVA, 33/11KV Inj. S/S at Shendam, Plateau South Biz Unit.                                                    | 6                                                    | Lump sum                                                          | NIPP                      | Ongoing       | Jun, 2011                     |
| 5                                                                 | Const. of 1x15MVA, 33/11KV Inj. S/S at Gboko, Gboko Biz Unit                                                                | 6                                                    | Lump sum                                                          | NIPP                      | Ongoing       | Jun, 2011                     |
| 6                                                                 | Const. of 1x7.5MVA, 33/11KV Inj. S/S at Wase, Plateau South Biz Unit                                                        | 6                                                    | 140, 000, 000.00                                                  | 2010 Budget               |               | Dec-11                        |
| 7                                                                 | Uprating of 1 x 7.5MVA to 1x15MVA, 33/11KV injection S/S at F/Mada to feed 6x300kVA 11/0.415kV & 7No 500kVA 11/0.415kV      | 4.3                                                  | 120,000,000.00                                                    | NPF                       | 0             | Jun, 2011                     |
| 8                                                                 | Const. of 1 x 7.5MVA, 33/11KV inj. S/S at Nasarawa Gate to fed 1No 11kV fdr of 3.5MW                                        | 6                                                    | 140,000,000.00                                                    | NPF                       | 0             | Jun, 2011                     |
| 9                                                                 | Const. of 6No 500kVA relief s/s & 1No 300kVA on Nasarawa 11kV fdr.                                                          | 2.64                                                 | 31,000,000.00                                                     | NPF                       | 0             | Jun, 2011                     |
| 10                                                                | Uprating of 2.5MVA S/s to 7.5MVA Shendam Town                                                                               | 2.5                                                  | 140                                                               | NPF                       | 0             | Dec-10                        |
| 11                                                                | Uprating of 1x7.5MVA to 1 x 15MVA, 33/11KV at Jos 'C' Inj S/S.                                                              | 5                                                    | 120                                                               | NPF                       | 0             | Apr-11                        |
| 12                                                                | 2) Const. of 1x15MVA 33/11KV Zaria Road Inj S/s                                                                             | 12                                                   | 150                                                               | NPF                       | 0             | Dec-13                        |
| 13                                                                | Uprating of Langtang 2.5MVA to 7.5MVA 33/11kV S/s                                                                           | 4                                                    | 140                                                               | NPF                       | 0             | Apr-11                        |
| 14                                                                | Const. 1x7.5 MVA, 33/11 KV Kafin Tafawa Inj. S/S.                                                                           | 6                                                    | 140                                                               | NPF                       | 0             | Jun, 2011                     |
| 15                                                                | 2) Const. of 18No 500KVA; 11/0.415KV S/s as Indicated blow, KTK, 11KV Fdr=6, RUKUBA 11KV Fdr=6, T/Balewa=4, 2No on Naraguta | 2.93                                                 | 81                                                                | NPF                       | 0             | Jun, 2011                     |

| KADUNA ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                                    |                                       |                      |                |                |                    |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------|---------------------------------------|----------------------|----------------|----------------|--------------------|
| S/N                                                           | PROJECTS                                                                                           | CONTRIBUTION TOWARDS GAP CLOSURE (MW) | ALLOCATED FUND (N M) | FUNDING SOURCE | STATUS         | PROJECTED DUE DATE |
| 1                                                             | const. of 1x15mva inj. s/s at police college mounted troop Kaduna                                  | 8.6                                   | 165                  | NIPP           | 5%             | June, 2011         |
|                                                               | const. of 6km, 33kv line from kaduna power station to proposed 1x15mva inj. s/s at police college. |                                       | 19.388               |                | 0%             | June, 2011         |
| 2                                                             | construction of 1no 7.5mva t/f at makarfi                                                          | 1.5                                   | 164.35               | NIPP           | 5%             | June, 2011         |
| 3                                                             | construction of 2km 11kv feeder at makarfi                                                         |                                       | 6.247                |                |                |                    |
| 4                                                             | 1x 15mva 33/11kv injection substation at abu                                                       | 12                                    | LUMP SUM             | NIPP           | 5%             | June, 2011         |
| 5                                                             | 1x 15mva 33/11kv injection substation at ringin sanbo                                              | 7.5                                   | LUMP SUM             | NIPP           | 5%             | June, 2011         |
| 6                                                             | 1) construction of 1x15mva inj.s/s at u/dosa                                                       | 8.5                                   | 165                  | NIPP           | 5%             | June, 2011         |
| 7                                                             | 2) construction of 22km,33kv line from mando t.s to u/dosa                                         |                                       | 71.092               |                | 0%             | Dec. 2013          |
| 8                                                             | construction of 1x7.5mva inj s/s at mothercat                                                      | 5                                     | 146.35               | NIPP           | 5%             | June, 2011         |
| 9                                                             | construction of 2km 11kv feeder from mother cat inj. s/s.                                          |                                       | 6.247                |                | 0%             | Dec. 2013          |
| 10                                                            | uprating of 2x7.5mva 33/11kv inj. s/s main office zaria to 2x15mva                                 | 8.5                                   | 80.6                 | NPF            | Newly proposed | Dec. 2011          |
| 11                                                            | construction of 1x7.5mva inj. s/s at zaria                                                         | 5                                     | 102                  | 2010 BUDGET    | In progress    | Dec. 2011          |
| 12                                                            | additional 1x7.5mva t/f at shika inj. s/s samaru zaria                                             | 4                                     | 102                  |                | 4.0MW          | Dec. 2011          |
| 13                                                            | construction of 1x7.5mva inj. s/s at kudan.                                                        | 4.7                                   | 164.350              | 2010 BUDGET    | In progress    | JUNE 2011          |
| 14                                                            | construction of 1no 3km, 11kv feeder                                                               |                                       | 9.371                |                |                |                    |
| 15                                                            | (I) construction of 2x7.5mva inj. s/s at jere.                                                     | 8                                     | 165                  | NPF            |                | Dec. 2011          |
| 16                                                            | (II) construction of 6km 2no 11kv feeders from jere inj. s/s                                       |                                       | 18.743               |                |                |                    |
| 17                                                            | (I)uprating of 2x7.5mva, 33/11kv inj. s/s to 2x15mva inj. s/s at illela road sokoto                | 12                                    | 104                  | NPF            |                | Dec. 2011          |
| 18                                                            | (II) construction of 10km 33kv line from t.s to illela road sokoto                                 |                                       | 32.314               |                |                |                    |
| 19                                                            | (III) const. of 6km, 2nos 11kv feeders from illela road inj. s/s.                                  |                                       | 18.743               |                |                |                    |
| 20                                                            | Const. of 2x7.5mva,33/11kv inj. s/s at hayin damani                                                |                                       | 146.572              | NPF            | 0%             | Dec 2011           |

|    |                                                                                                        |      |                |             |    |          |
|----|--------------------------------------------------------------------------------------------------------|------|----------------|-------------|----|----------|
| 21 | Const. of 10 km 33kv line from mando t.s to hayin-damani                                               | 10.0 | 32.314         | NPF         | 0% | Dec 2011 |
| 22 | Const. of 6km 2nos 11kv line from proposed hayin-damani inj. s/s                                       |      | 31.239         | NPF         | 0% | Dec 2011 |
| 23 | replacement of faulty 11kv panels (obsolete) at 2x15mva,33/11kv pan inj. s/s                           | 18   | 38.650         | New Project | 0% | Dec 2011 |
| 24 | replacement of faulty and obsolete 11kv panel and tripping unit at 2x7.5mva, 33/11kv kudenede inj. s/s |      | 38.650         | New Project | 0% | Dec 2011 |
| 25 | (II) const. of 3km,11kv fdr from dawaki inj. s/s. part of dawaki inj. s/s project to close gap         | 5    | 12.495         | New Project | 0% | Dec 2011 |
| 26 | (I) const. of 2x7.5mva 33/11kv inj. s/s at trade fair complex                                          | 12.0 | 146,572,638.00 | NPF         |    | Dec 2011 |
| 27 | Const. of 2nos 11kv fdr 3km each at proposed trade fair complex inj. s/s.                              |      | 18,743,820.00  | NPF         |    | Dec 2011 |

| KANO ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets) |                                                                                                                                |                                  |                                           |                              |                                   |                    |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------|------------------------------|-----------------------------------|--------------------|
| S/NO                                                        | PROJECTS                                                                                                                       | CONTRIBUTION TOWARDS GAP CLOSURE | ALLOCATED FUND/ESTIMATED COST OF PROJECTS | FUNDING SOURCE               | STATUS                            | PROJECTED DUE DATE |
| 1                                                           | Rehabilitation of substandard and vandalised portions of the feeder (i.e. Kumbotso TS-Dakasalle) to enable it evacuate 17.5MW. | 28.85                            | 268.25                                    | NPF                          | Work yet to start                 | Jun, 2011          |
| 2                                                           | Radiation of Dakasalle 33KV feeder ex-proposed Kornar Dangora 1X30MVA, 132/33KV T/S to close the gap (13MW).                   |                                  |                                           | NPF                          | Work yet to start                 | 31-Dec-2013        |
| 3                                                           | Rehabilitation of 11KV Tiga & Rano Fdrs.                                                                                       |                                  | 38.426                                    | NPF                          | Work yet to start                 | Jun, 2011          |
| 4                                                           | Uprating of 22nos. Distribution Transformers                                                                                   |                                  | 71.39                                     | 2010 Budget                  | Work yet to start                 | Jun, 2011          |
| 5                                                           | Rehabilitation of 18nos. substandard Dist. S/S                                                                                 |                                  | 7.47                                      | 2010 Budget                  | Work yet to start                 | Jun, 2011          |
| 6                                                           | <b>WUDIL</b><br>Radiation of a 33KV to deload 33KV Wudil/Zaria Rd Feeder from proposed Walalamba TS.                           | 15.68                            | 19.1616                                   | 2009 Budget/NPF              | Line construction yet to commence | Jun, 2011          |
| 7                                                           | Rehabilitation of 10nos. substandard Dist. S/S                                                                                 |                                  | 9.960                                     | Partly funded by 2010 Budget | Work yet to start                 | Jun, 2011          |
| 8                                                           | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                       |                                  | 4.036                                     | Partly funded by 2010 Budget | Work yet to start                 | Jun, 2011          |
| 9                                                           | <b>DAURA</b><br>Deloading 33KV Daura Fdr by 7.5MW to proposed Daura 1X30MVA 132/33KV TS                                        | 6.15                             | 108.371                                   | NPF                          | Work yet to start                 | Jun 2011           |
| 10                                                          | Rehabilitation of 20nos. substandard Dist. S/S                                                                                 |                                  | 8.30                                      | Partly funded by 2010 Budget | Work yet to start                 | Jun 2011           |
| 11                                                          | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                       |                                  | 6.195                                     | Partly funded by 2010 Budget | Work yet to start                 | Jun 2011           |
| 12                                                          | <b>KAZAURE</b><br>Rehabilitation of 33KV Kazaure/Danbatta Fdr                                                                  | 7.35                             | 19.5                                      | NPF                          | Work yet to start                 | Jun 2011           |
| 13                                                          | Rehabilitation of 15nos. substandard Dist. S/S                                                                                 |                                  | 6.225                                     | 2010 Budget                  | Work yet to start                 | Jun 2011           |
| 14                                                          | Purchase of Upriser & LV Cables for vandalised Dist. S/S                                                                       |                                  | 6.195                                     | 2010 Budget                  | Work yet to start                 | Jun 2011           |

|    |                                                              |      |        |             |                   |             |
|----|--------------------------------------------------------------|------|--------|-------------|-------------------|-------------|
| 15 | <b>KANKIA</b><br>Rehabilitation of 33KV Kankia/Dutsin ma Fdr | 2.0  | 14.50  | NPF         | Work yet to start | Jun 2011    |
| 16 | Rehabilitation of 10nos. substandard Dist. S/S               |      | 9.960  | 2010 Budget | Work yet to start | Jun 2011    |
| 17 | <b>BICHI</b><br>Rehabilitation of 33KV Bichi Fdr             | 3.3  | 10.35  | NPF         | Work yet to start | Jun 2011    |
| 18 | Rehabilitation of 14nos. substandard Dist. S/S               |      | 5.81   | 2010 Budget | Work yet to start | Jun 2011    |
| 19 | <b>BININ KUDU</b><br>Rehabilitation of 33KV Binin Kudu Fdr   | 1.89 | 6.42   | NPF         | Work yet to start | Jun 2011    |
| 20 | Rehabilitation of 12nos. substandard Dist. S/S               |      | 4.98   | 2010 Budget | Work yet to start | Jun 2011    |
| 21 | Purchase of Upriser & LV Cables for vandalised Dist. S/S     |      | 6.195  | 2010 Budget | Work yet to start | Jun 2011    |
| 22 | Uprating of 4nos. Distribution Transformers                  |      | 12.98  | 2010 Budget |                   | Jun 2011    |
| 23 | Rehabilitation of 10nos. substandard Dist. S/S               |      | 4.15   | 2010 Budget | Work yet to start | Jun 2011    |
| 24 | <b>NGURU</b><br>Rehabilitation of 33KV Nguru Fdr             | 1.15 | 9.2    | NPF         | Work yet to start | 30-Apr-2011 |
| 25 | Rehabilitation of 5nos. substandard Dist. S/S                |      | 1.66   | 2010 Budget | Work yet to start | 30-Apr-2011 |
| 26 | Purchase of Upriser & LV Cables for vandalised Dist. S/S     |      | 1.65   | 2010 Budget | Work yet to start | 30-Apr-2011 |
| 27 | <b>KAFIN HAUSA</b><br>Rehabilitation of 33KV Kafin Hausa Fdr | 1.17 | 11.24  | NPF         | Work yet to start | 30-Apr-2011 |
| 28 | Rehabilitation of 10nos. substandard Dist. S/S               |      | 4.15   | 2010 Budget | Work yet to start | 30-Apr-2011 |
| 29 | <b>MALUMFASHI</b><br>Rehabilitation of 33KV Malumfashi Fdr   | 3.11 | 14.026 | NPF         | Work yet to start | Jun 2011    |
| 30 | Rehabilitation of 12nos. substandard Dist. S/S               |      | 4.98   | 2010 Budget | Work yet to start | Jun 2011    |
| 31 | Purchase of Upriser & LV Cables for vandalised Dist. S/S     |      | 4.15   | 2010 Budget | Work yet to start | Jun 2011    |
| 32 | <b>DANDUME</b><br>Rehabilitation of 33KV Dandume Fdr         | 0.95 | 15.00  | NPF         | Work yet to start | Jun 2011    |
| 33 | Rehabilitation of 7nos. substandard Dist. S/S                |      | 9.7350 | 2010 Budget | Work yet to start | Jun 2011    |
| 34 | Purchase of Upriser & LV Cables for vandalised Dist. S/S     |      | 3.320  | 2010 Budget | Work yet to start | Jun 2011    |
| 35 | <b>TEXTILE</b><br>Rehabilitation of 33KV Textile Fdr         | 0.8  | 14.026 | NPF         | Work yet to start | Jun 2011    |

|    |                                                          |      |            |             |                   |          |
|----|----------------------------------------------------------|------|------------|-------------|-------------------|----------|
| 36 | <b>SUMAILA</b><br>Rehabilitation of 33KV Sumaila Fdr     | 1.12 | 7.59       | NPF         | Work yet to start | Jun 2011 |
| 37 | Rehabilitation of 10nos. substandard Dist. S/S           |      | 4.15       | 2010 Budget | Work yet to start | Jun 2011 |
| 38 | Purchase of Upriser & LV Cables for vandalised Dist. S/S |      | 6.195      | 2010 Budget | Work yet to start | Jun 2011 |
| 39 | <b>JAHUN</b><br>Rehabilitation of 33KV Jahun Fdr         | 1.17 | 5.25       | NPF         | Work yet to start | Jun 2011 |
| 40 | Rehabilitation of 10nos. substandard Dist. S/S           |      | 4.15       | 2010 Budget | Work yet to start | Jun 2011 |
| 41 | Proposed 2 X 15MVA, 33/11KV Inj. S/S at Gongoni          | 24   | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 42 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Kofamata        | 12   | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 43 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Onna            | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 44 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Farm Centre     | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 45 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Rijiya Zaki     | 12   | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 46 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at PRP             | 12   | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 47 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Dakassale       | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 48 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Katsina GRA     | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 49 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Dutse           | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |
| 50 | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Hadejia         | 6    | Lumped Sum | NIPP        | On-going          | Dec 2011 |

**PORT HARCOURT ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets)**

| S/N | PROJECTS                                                                                                     | CONTRIBUTION<br>TOWARDS GAP<br>CLOSURE (MW) | ALLOCATED FUND<br>(N M) | FUNDING<br>SOURCE | STATUS          | PROJECTED<br>DUE DATE |
|-----|--------------------------------------------------------------------------------------------------------------|---------------------------------------------|-------------------------|-------------------|-----------------|-----------------------|
| 1   | Proposed 2 X 15MVA, 33/11KV Inj. S/S at Borokiri Town, PH                                                    | 1.1                                         | Lumped Sum              | NIPP              | On-going        | Dec 2011              |
|     | Proposed 1 X 15MVA, 33/11KV Inj.S/S at Eastern Bye-Pass, PH                                                  |                                             | Lumped Sum              | NIPP              | On-going        | Dec 2011              |
|     | Installation of 5 x 500KVA 11/0.415KV Substations to relieve 5No overloaded transformers at Marine Base area |                                             | 33                      | NPF               |                 | Dec 2013              |
| 2   | Rehabilitation of Onna 33KV Line Ex. Eket Transmission Station (197.09km Route Length)                       | 5.0                                         | 21.778                  | NPF               | Yet to commence | Dec 2013              |
| 3   | Rehabilitation of Mbo 33KV Line Ex. Eket Transmission Station (147.21km route length).                       | 5.0                                         | 16,253                  | NPF               | Yet to commence | Dec 2013              |
| 4   | Proposed rehabilitation of Ukpom 11KV Fdr Ex. Ukpom Inj. S/S and all its Tee-Offs (13.25km Route Length)     | 5.0                                         | 1,464                   | NPF               | Yet to commence | Dec 2013              |
| 5   | Construction of proposed 33KV line Ex. Uyo T/S to the proposed Tropicana Injection Substation (7.77km).      | 18.0                                        | 31,080                  | NPF               | Yet to commence | Dec 2013              |
| 6   | Proposed construction of Ibesikpo 33KV Feeder, Ex Uyo T/S (3.0km)                                            | 5.0                                         | 12,000                  | NPF               | Yet to commence | Dec 2013              |
| 7   | Proposed 1 X 15MVA, 33/11KV Inj.S/S at Eliozu (East/West-Okporo)                                             | 12                                          | Lumped sum              | NIPP              | On-going        | Dec 2011              |
| 8   | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Opolo, Yenagoa                                                      | 6                                           | Lumped sum              | NIPP              | Ongoing         | Dec 2011              |
| 9   | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Swali, Yenagoa                                                      | 6                                           | Lumped sum              | NIPP              | Ongoing         | Dec 2011              |
| 10  | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Gbarian/Ubie                                                        | 6                                           | Lumped sum              | NIPP              | Ongoing         | Dec 2011              |
| 11  | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at Ovom, Yenagoa                                                       | 12                                          | Lumped Sum              | NIPP              |                 | Dec 2011              |
| 12  | Proposed 2 X 7.5MVA, 33/11KV Inj. S/S at CRUTECH, Calabar                                                    | 12                                          | Lumped Sum              | NIPP              | On-going        | Dec 2011              |

|    |                                                                  |     |            |      |          |          |
|----|------------------------------------------------------------------|-----|------------|------|----------|----------|
| 13 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Ikot Abasi              | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 14 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Onna                    | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 15 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Ikot Akama (Ikot Abasi) | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 16 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Etinan                  | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 17 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Esuk Utan, Calabar      | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 18 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Diamond Hill, Calabar   | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 19 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Amika, Calabar          | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 20 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Ibesikpo                | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 21 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Ikot Abasi              | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 22 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Onna                    | 6.  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 23 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Ikot Akama (Ikot Abasi) | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 24 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Etinan                  | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |
| 25 | Proposed 1 X 15MVA, 33/11KV Inj. S/S at Ogoja                    | 12  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 26 | Proposed 2nd 15MVA, 33/11KV Inj. S/S at Ikom Town                | 12. | Lumped Sum | NIPP | On-going | Dec 2011 |
| 27 | Proposed 2nd 15MVA, 33/11KV Inj. S/S at Ogoja                    | 12  | Lumped Sum | NIPP | On-going | Dec 2011 |
| 28 | Proposed 1 X 7.5MVA, 33/11KV Inj. S/S at Obudu                   | 6   | Lumped Sum | NIPP | On-going | Dec 2011 |

| <b>YOLA ELECTRICITY DISTRIBUTION COMPANY (Medium Term Targets)</b> |                                                                                                           |                                                      |                                                                   |                           |               |                               |
|--------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------|---------------------------|---------------|-------------------------------|
| <b>S/N</b>                                                         | <b>PROJECTS</b>                                                                                           | <b>CONTRIBUTION<br/>TOWARDS GAP CLOSURE<br/>(MW)</b> | <b>ALLOCATED<br/>FUND/ESTIMATED<br/>COST OF PROJECTS<br/>(NM)</b> | <b>FUNDING<br/>SOURCE</b> | <b>STATUS</b> | <b>PROJECTED<br/>DUE DATE</b> |
| 1                                                                  | uprating of 1X15mva to 2x 15mva 33/11kv inj. s/s at baga road & 4 additional 11kv fdrs at mmc secretariat | 8                                                    | 300                                                               | NPF                       | new projects  | apr-11                        |
| 2                                                                  | construction of 1x 15mva 33/11kv injection s/s and 2 additional 11kv fdrs at jiddari polo                 | 5.7                                                  | 190                                                               | NPF                       | new project   | apr-11                        |
| 3                                                                  | Const. of 1x 15mva 33/11kv injection s/s and 2 additional 11kv fdrs at Abuja talakawa                     | 3.5                                                  | 198                                                               | NPF                       | new project   | apr-11                        |
| 4                                                                  | upgrading of 1x 2.5mva 33/11kv injection s/s to 1x7.5mva, 33/11kv inj. s/s at maiduguri (chad basin)      | 1.6                                                  | 130                                                               | NPF                       | new project   | apr-11                        |
| 5                                                                  | creation of 33kv 707 housing units fdr to relief beneshiek fdr                                            | 3.6                                                  | 90                                                                | NPF                       | new project   | apr-11                        |
| 6                                                                  | load transfer from damasak to munguno fdr                                                                 | 2.5                                                  | 2                                                                 | NPF                       | new project   | apr-11                        |
| 7                                                                  | creation of 33kv kasuwar wake fdr from tx                                                                 | 2                                                    | 16                                                                | NPF                       | new project   | apr-11                        |

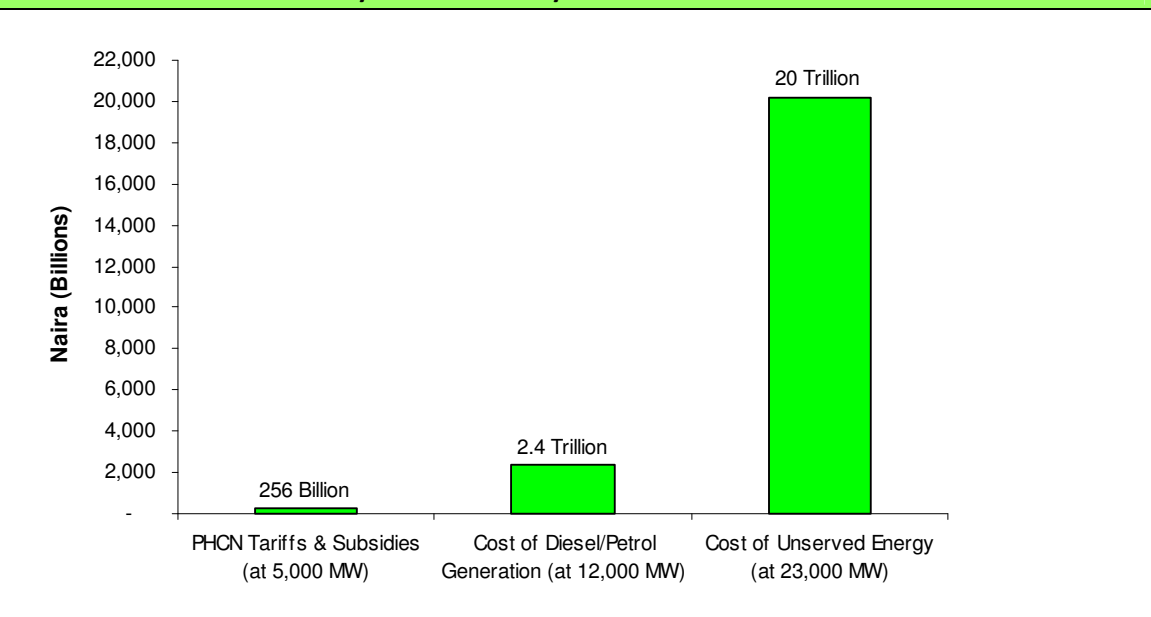
## Appendix – The cost of unserved energy

A typical – and easily understood – method of estimating the cost of unserved energy (“CUE”) is to base the CUE estimates on the ratio of GDP to electricity supply of a “role model” economy whose current GDP the aspirant country could reasonably be expected to reach within the next 10 years provided it had a sufficient electricity supply.

In the case of Nigeria, the obvious role model economy is South Africa whose current actual generating capacity (at 40,000 MW) is exactly the number which Nigeria aspires to obtain by 2020. Dividing the Rand value of South Africa’s GDP at market prices by the KWh of electricity sold by Eskom results in a CUE of just over 10 Rand per KWh. At an exchange rate of 20 Naira/Rand, that converts to a CUE for Nigeria of 200 Naira per KWh.

Given this CUE, the chart below illustrates the cost in terms of lost GDP per annum that the country will suffer in the “worst case” scenario (i.e. a scenario where the grid-based generation and transmission capacity remains at the levels exhibited over the previous two decades i.e. less than 5,000 MW).

**The annual “opportunity cost” paid by 2020 if Nigeria fails to introduce a regulatory regime which allows for the financial viability of the electricity sector**



**Assumptions:**

1. If prices continue to remain below “financially viable” levels, the actual generating capacity of PHCN/NIPP and any successor power plants will never exceed 5,000 MW.
2. The capacity of diesel and petrol generators will grow from circa 6,000 MW to 12,000 MW.
3. The unit price of electricity provided by diesel and petrol generators will remain at circa 45 Naira per KWh.
4. The cost of unserved energy is 200 Naira per KWh.

In this worst case, the gap between the Nigeria’s 2020 power generation and transmission target (which is the figure currently enjoyed by South Africa despite its much smaller population) and the total amount of capacity (including diesel and petrol generators) will be

circa 23,000 MW (assuming petrol and diesel generation has doubled from its current estimate of 6,000 MW).

At a CUE of N200/kWh that converts into a cost (in terms of lost GDP) of 20 trillion Naira in real terms (circa USD\$ 130bn) every year (or six times annual Federal consolidated revenues).

The same figures can also be used to calculate the cost of failing to provide FGN credit enhancement to the bulk purchaser and thereby delaying the urgently needed flow of private investment into power generation.

In the example shown in Section 2.3 of this chapter, we provided an estimate of the amount of GDP growth that would be lost if FGN credit enhancement is not provided to the bulk purchaser over the next 3 years to support PPAs for a cumulative sum of 9,000 MW (i.e. 3,000 MW per annum). If this credit enhancement is not provided, it is our expectation that the development and construction of these plants could be delayed for 4 years (a pragmatic estimate of the time it might take for the distribution companies to become commercially viable and credit-worthy). Using the figures shown in the Chart above, the cumulative cost of delaying (by 4 years or more) the construction of 9,000 MW would be at least USD\$ 200 billion (i.e.  $9/23 * 130 * 4$ ).