



ENERGY SECTOR STRATEGY NOTE

DEPAC MEETING, MARCH 29 2007

EXECUTIVE SUMMARY

This strategy presentation aims to inform the donor community of current issues and concerns in the energy sector (particularly the power sub-sector), as well as highlighting current reform, expansion and investment initiatives being pursued to address sector issues in the short, medium and long-term. Among the main issues:

Immediate and short-term

- Stabilize and turn around the current power crisis, with its very detrimental impact on the economy, employment and public revenues, through:
 - Completion of the Bumbuna hydropower project and associated transmission line.
 - Earliest possible repair of existing thermal units, and the earliest possible commissioning of new ones already under contract
 - A management contract with a qualified firm to take over NPA management, resurrect its operational status by institutional reform, introduce appropriate commercial practices and ensure the maintenance and integrity of NPA's assets. Complete the downsizing of staff with the associated termination benefits/social mitigation
 - Upgrade as quickly as possible the transmission network in Freetown and major towns
 - Adjust power tariffs to reflect production costs under reasonably efficient production and distribution assumptions
- Prepare a comprehensive and costed energy sector strategy, through the Energy Sector Strategy Task Force, led and chaired by the Ministry of Energy & Power, for presentation in the fourth quarter of 2007 and completion in early 2008
- Finalize necessary sub-sector strategies and master plans (e.g. Rural Electrification Policy), and the appropriate legal and regulatory frameworks for an efficiently run and monitored electricity sector.
- Add generation capacity, including thermal, in selected towns and continue improvements in distribution systems

Medium and long-term

- Develop new hydroelectric power projects, including integrated water and power projects, and through independent power producers.
- Further analyse and develop the potential for mini-hydropower schemes, solar power schemes, biomass schemes, and other such opportunities for bringing electricity to rural areas.

Comprehensive cost estimates are not available at this time, but several of the specific immediate and short-term activities have a fairly well known price range. As the power sector is extremely investment intensive, and Sierra Leone is not yet at a stage where reputable private investors are likely to be interested in the short run, government will be seeking cooperation from its development partners in financing many, if not most, of the activities highlighted.

ENERGY SERVICES, PRODUCTIVITY & GROWTH

Presently, the electricity sub-sector in Sierra Leone can best be characterised as being in a state of crisis and facing a variety of problems. Government is well aware of the link between energy services and the need to focus more on protecting and promoting the interests of the poor. The provision of energy services, in particular electricity (both off and on-grid), will clearly have a significant positive impact on employment generation through enhancing the provision of public goods aimed at supporting higher growth and the overall poverty reduction process. A highlight of the Government of Sierra Leone's (GoSL's) strategy is adopting generation and distribution technologies that can be replicated for community mobilization, as well as making policy choices about market structure, regulation, and pricing that will allow access to reliable, reasonably priced energy—particularly by industry, agriculture, and the commercial sector—important catalysts for growth. Accordingly, the GoSL is looking at projects aimed at increasing the capacity of the energy sector to contribute to productivity, and growth, alongside projects that are more narrowly focused on expanding access to improved energy services for low-income or geographically dispersed communities.

Investments to expand and improve energy services underline the GoSL's current economic and social development policy. The government is committed to expanding access to reliable sources of energy—gas, electricity, petroleum products—for agriculture, industry, commerce, and households, as a primer for growth in productivity and output. With these objectives, GoSL wishes to deepen its collaboration with the donor community so as to accelerate our efforts to enhance the supply of energy in a sustainable manner and extend the scope of our reform programme to those key areas that we are yet to fully address.

IMMEDIATE ISSUES & ACTIONS (2007-2008)

Government's key focus at this stage is stabilization of power supplies through corrective actions at NPA (preparation of a management contract), improving revenue position through tariff amendments, adding additional generating capacity (the Office National d'Electricité (ONE) of Morocco initiative), completion of the Bumbuna HEP (particularly resolving finance issues), and the preparation of a Task Force to develop a sector strategy that will guide decision-making, add transparency and provide enabling environment for future investment in the sector.

Current Activities & Priorities at NPA

NPA, the country's utility, established in 1982, is in charge of the generation, transmission, distribution, supply and sale of electricity. The Kingtom Power Station (KPS), currently the only available generating station in the Western Area, has an installed capacity of 39 MW (current available capacity is around 8 MW) and very poor availability and reliability track-record. NPA provides service to a customer base of 45,000 with nearly 600 employees.

The transmission and distribution (T&D) network covers an area of 450 sq km and can safely transport 25 MW out of a designed capacity of 36 MW. In 2005, the utility produced 53.5 GWh, a 56% decline from its peak of 123.5 GWh in 2002 (2006 estimates were 24 GWh).

NPA is experiencing poor commercial performance, due to the low reliability of public mains supply. Revenues in 2005 fell to USD 8.6 million, equivalent to a 36% decrease from its level in 2003. Net income has been consistently negative, averaging USD 8.1 million over the last five years. While the collection from large industrial customers is generally acceptable, NPA's Commercial Department struggles to collect revenue and outstanding debt remains very high. The present level of non-technical losses, around 20%, is clearly unacceptable. NPA has instituted a general tightening-up of procedures but the installation of prepayment meters is seen as part of the solution for recalcitrant groups of consumers. Meter test facilities and the purchase of additional prepayment meters should all help to reduce non-technical losses, as well as the establishment of new Customer Service Centres. Additionally, government is committed to ensuring that cost-recovery tariffs are set ahead of the Bumbuna project completion in Q4 2007. This tariff adjustment will be followed up with a full tariff study to be designed and implemented in the coming 12 months.

With respect to staffing, NPA staff numbers currently stand at over 600. A recent study by NPA indicated 241 were considered suitable for retrenchment ('dormant' staff). According to the NPA conditions of service, severance payments of approximately Le 5 billion would need to be paid. NPA's financial position is such that it is unable to make such payments.

Current Donor-Supported Initiatives

Donor activities currently include:

- (i) Sierra Leone Power and Water Project - IDA Credit US\$20 million covers institutional development, regulatory development, legal frameworks for sector, capacity-building, rehabilitation and maintenance. The GoSL, with support from the National Commission for Privatization (NCP) and its advisers are preparing terms of reference for a transaction adviser to prepare a Management Contract (to commence in January 2008) to support NPA management and operations and effectively take over the day to day management. The

contract will involve a fixed fee with incentive payment system based on performance criteria

- (ii) The GoSL secured funds from the Republic of South Africa Government for the acquisition and installation of a 6.9MW diesel generating unit at the Kingtom Power Station which has been installed and pre-commissioned on light fuel but because of cooling problems could not be fully commissioned to run on heavy fuel. A new cooling tower has been purchased to improve cooling and it is expected that the engine would be operational in April 2007.
- (iii) The GoSL secured funding from the Arab Bank for Economic Development in Africa (BADEA) and the Saudi Development Fund (SDF) for the acquisition of 3 x 7.56MW diesel generating units to be installed at the Blackhall Road site in mid 2008.
- (iv) GoSL is expecting confirmation of funding from the Japan International Cooperation Agency (JICA) for the supply of two further generators of 5 MW each with an expected commissioning by mid 2009. Estimated cost is approximately US\$10 million. The elements of this assistance package include:
 - 1. 2 x 5 MW generating sets at the Kingtom Power Station;
 - 2. New 33 kV sub-station at Regent;
 - 3. New 33 kV lines between Wilberforce and the Regent sub-station;
 - 4. New 11 kV lines between Kingtom and Wilberforce, on the one hand, and between Falconbridge and Blackhall Road, on the other.
- (v) GoSL is expecting confirmation of funding from the Islamic Development Bank (IDB) for the supply and installation of new 11 kV lines and low voltage lines, on the one hand, and for customer service improvement activities and technical assistance (TA) for capacity building, on the other.

Office National d'Electricité (ONE) Initiatives

The poor situation of the NPA network led His Excellency the President to make a request to the King of Morocco for assistance last year. Consequently, a technical mission from the Moroccan Power Utility (ONE) was sent to Freetown in March 2006 to assess the situation and assist NPA by designing a correction action plan to improve the existing power supply situation. ONE prepared a report in August 2006 recommending, among other activities:

- The rehabilitation of existing assets (generation, transmission and distribution) in order to stabilise the sector. This was a prerequisite to injecting new generating capacity and entertaining any sector restructuring alternatives. (This is in addition to current World bank initiatives, IDB proposals and NPA's recovery plan)

Work on the rehabilitation began on November 2nd 2006 and is expected to be completed by first quarter 2008. The budget for the rehabilitation, which also includes part purchase of fuel for the existing generating plants, is approximately

USD 30 million and is to be funded through a donor conference (comprising non-traditional donors) to be held in Morocco in April 2007. As part of the provision of additional generating capacity ONE is entering into a Power Purchase Agreement with NPA for a 10 MW thermal power plant at the Kingtom site. This should, hopefully, commence in early June, 2007.

The Bumbuna Hydroelectric Project (BHEP)

The 50MW Bumbuna Hydro Electric Project (BHEP) is now scheduled to be completed and commissioned in late 2007 with the support of various donors, including AfDB, IDA and Italian Government. At present there are a number of issues potentially stalling completion. These include:

1. The construction of a by-pass valued at US\$ 900,000 (this is a requirement for final environmental oversight committee approval);
2. The completion of the relocation and compensation of displaced communities (a social action support program by donors to finance compensation is required); and
3. The completion of the transmission (financed by a loan from the OPEC Fund) and distribution network (currently OPEC is supporting this initiative, with Japan planning additional support).

Additional rehabilitation of both medium and low voltage lines will continue up to and beyond the commissioning of BHEP and is estimated in NPA's recovery plan as shown in Annex 1.

Financing for completion of the dam, power house and electromechanical equipment has been envisaged to be on commercial terms, backed by a guarantee from IDA. Apart from the cost of such financing, negotiations between government and the contractor have not been completed and the outcome is, in fact, uncertain. In those circumstances government is looking for alternative sources of finance, so that this vital operation can be completed (as shown in Annex 2).

Creation of Energy Task Force

To promote greater cooperation and coordination in the sector and facilitate the development of an energy sector strategy that will serve as a road-map for future growth and development, an Energy Sector Strategy Task Force is to be set up, and would include representatives from the Ministry of Energy and Power, Ministry of Presidential Affairs, Ministry of Finance, Ministry of Development and Economic Planning, National Commission for Privatization and other relevant stakeholders. The Task Force will be charged with preparation of an Energy Sector Strategy by the last quarter of 2007. As the Ministry responsible for policy development, the Task Force will be chaired by the Ministry of Energy and Power with coordination being provided through the National Energy and Water Policy,

Planning and Coordination Unit (NEWPPCU)¹, supported technical advisers at the NCP. This task Force will overcome the current lack of cohesion that exists in the sector with multiple players and builds on an earlier energy policy development exercise, funded by UNECA and carried out by CEMMATS Group Ltd., a local consulting company, in 2004.

Areas Requiring Immediate Development Partner Support:

- The completion of the Bumbuna hydropower project
- Western Area Sub-Transmission & Distribution Systems – Specifically 33kV/LV distribution transformers to ring the peninsula in outlying areas
- Repair of Primary substation inter-connectors in Freetown
- Repair of faulty underground cables and reinforcement of 11kV feeders within Freetown
- Billing & Collection Systems – particularly construction of two customer service centres
- IT Equipment and Fault Detection Equipment
- Technical assistance and Capacity Building for Billing and Accounting, in particular training of NPA Finance Department staff in procedures
- NPA downsizing – social mitigation costs for staff redundancies

Detailed costing of the above activities is contained in Annex 3.

SHORT-TERM STRATEGY (2008-2010)

Beyond the immediate twelve months, a number of key targets have been identified by government in anticipation of completion and approval of a final energy strategy document. GoSL is working towards the following areas in the short term:

- Finalize and approve comprehensive strategy/policy for sector – The Task Force is to submit a draft strategy document by Q4 2007 after which stakeholder meetings and workshops will be undertaken and a final draft submitted to cabinet for approval by the end of the first quarter of 2008.
- Finalize and approve a Rural Electrification Policy (including both on and off-grid solutions to provide access to rural communities). This policy is to be drafted in conjunction with the main comprehensive policy document, taking into consideration existing decentralization initiatives for the regions to assume greater responsibility in management of services.
- Finalize Passage of Electricity Law facilitating creation of a regulator – Consultants funded by the IDA have prepared a legal framework for the electricity sector. Key guiding policy principles have been the intention to promote private sector participation to secure new capacity additions and rehabilitation of existing assets. However the existing legal and regulatory

¹ Ahead of the creation of the Task Force, NEWPPCU had commenced work on an Energy Strategy document, the nucleus of which is incorporated in this presentation.

- framework is not attractive to such investment. It is envisaged that a two-stage process for reform will be undertaken:
- Stage One - NPA remains vertically integrated and continues to operate under the NPA Act but with amendments to facilitate private generation (the NPA ‘Bumbuna’ Amendment of 2006). Furthermore a new independent regulatory agency will be formed (with a new statute) with regulatory functions passing from NPA to the new agency.
 - Stage Two envisages an interconnection of NPA and BKPS systems and a restructuring of NPA into a company limited under the Companies Act; ‘NPCo’ future role would then be determined during development of long-term strategy
- Creation of the institutional framework for regulator– It is expected that once the strategy document is completed the electricity law will be submitted to parliament for approval last quarter 2007. The institutional framework for the regulatory body, including staffing, organizational structure, remuneration and training will be undertaken to coincide with approval by Parliament.
 - Implement restructuring plan for NPA – A strategic recovery plan has been prepared by NPA to complement current efforts by GoSL, IDA, BADEA/SDF, IDB, JICA and ONE, aimed at increasing generating capacity by a further 70MW and paving the way for retirement of the 2x9.2 MW Sulzer machines. It is expected that the management contractor to be hired will oversee implementation of the plan. The plan also addresses the required increase in the network transport capacity to 100 MW within the Western Area.
 - Regulator fully operational – Underlining the role of the regulator the passage of secondary legislation is envisaged (codes created: grid, transmission and distribution; quality of service & supply) establishing clear market rules for all sector participants.

Areas for Development Partner Support in the Short-Term:

- **Financing the procurement** of additional generating plant at Falconbridge (4x 15MW steam turbines) including associated interconnections and transmission lines
- Expand supply to Koidu through 2 x 1 MW diesel generators
- Expand supply to Lungi township through 3 x 500kW diesel generators
- Improve distribution at Makeni through extensions to LV and MV systems
- Expansion of commercial loss reduction measures through installation of a further 50,000 pre-payment meters
- Training and capacity building of NPA staff through specialized, tailored engineering maintenance training courses
- Undertake detailed Power Sector Investment Program for 2008-2015 – An expansion of the study first undertaken by Lahmeyer International in 1996 and partially completed by PPA under World Bank funding in October

2006 is urgently required. In particular an assessment of the following is needed:

- demand of rural, urban and peri-rural users
- load forecast for the Western, Eastern, Northern and Southern areas
- medium to long term investment program consistent with the load forecast established including all necessary investments in new and upgraded generation (including hydro, biomass/renewable, and thermal), transmission and distribution equipment
- Technical Assistance for institutional capacity-building for regulatory body – Specifically support in drafting secondary legislation (electricity codes, rules and regulations).
- Development of rural electrification

Detailed costing of the foregoing activities is contained in Annex 4.

MEDIUM-TERM STRATEGY (2010-2015)

Initiatives and activities scheduled over the immediate and short-term will lay the foundations for long term stability of electricity supply at sustainable competitive costs in support of economic development. Implementation of the policy framework will extend beyond the short term focus on stabilisation and rehabilitation. In particular the rules and regulations will be established that will determine the market structure and regulate and oversee generation, distribution and transmission in the sector. Specific policy targets for the medium term include:

- Development of Hydroelectric Power Projects (IPPs and IWPPs) - Hydro potential in the country appears the most abundant renewable resource, with prospects of generating 1200MW, as highlighted in the Master Plan. Currently, the Bumbuna project (Phase 1) and the envisaged Bumbuna Phase 2 (i.e., Yiben) and Bekongor projects some of the most prominent large-scale projects that are thought to be economically exploitable. Given the huge potential for hydroelectric power, and the current issues related to water resource management, combined power and water projects (IWPPs) are potentially efficient methods of meeting both power and water requirements for the populace in future. The implementation of these projects requires the conduct of environmental, social and bio-diversity impact assessments.
- Private Sector Participation
 - Generation - Capacities below 2 MW have not yet been investigated thoroughly, although this is expected to be an area of huge potential for public-private partnerships and wider investment by the private sector. The potential for small-scale private initiatives and public-private partnerships will be encouraged for projects involving small hydro facilities of capacities of up to 1 MW,

particularly in Freetown's environs and the rural provinces. This is one of the key policy instruments designed to achieve Sierra Leone's MDG objectives for energy access.

- Transmission & Distribution - Once the legal, regulatory and institutional framework for the sector has been implemented, there is significant potential to introduce private sector operators in the area of distribution and supply, possibly through the creation of regional distribution companies. .
- Implementation of Rural Electrification Policy – The target of achieving electricity coverage of 75% a specific policy will be implemented. The main objective will be to use cost effective sources of renewable energy in areas where conventional methods of electrification cannot be economically justified. It is intended that such projects will be fashioned to meet community needs and complement priority government programmes in education, health and sanitation.
- 70% use of renewable energy sources - Biomass resources were estimated in the first Power Sector Master Plan² to be a total annual energy potential of 2,700 GWh (corresponding to a capacity of 308 MW). Furthermore, solar radiation was estimated in the Plan at 1460-1800 GWh per annum, allowing the potential to utilise solar photovoltaic solutions for lighting and water pumping, amongst other potential applications.

Average wind speed was recorded in the Master Plan as between 3-5 m/s, whilst its application may be limited to small scale water pumping applications, its further investigation will be encouraged.

- Development of energy conservation guidelines aimed at safeguarding the environment

Areas for Development Partner Support in the Medium-Term:

- Technical assistance in the design of energy efficiency and environmentally friendly energy sector growth strategies (conservation guidelines) in coordination between Ministry of Energy & Power, Ministry of Agriculture, Forestry and the Environment, and the Environmental Commission.
- Technical Assistance in design and implementation of national grid system for Sierra Leone.
- Feasibility Study and Action Plan for Exploitation of Renewable Energy Sources in Peri-Urban and Rural Communities.
- Detailed feasibility study on Bumbuna Phase 2 (Yiben) and Bekongor.

² Lahmeyer International undertook a detailed review of the Energy Sector in 1996, drafting Sierra Leone's first Power Sector Master Plan.

- Funding for the conduct of strategic impact assessments (environmental, social and bio-diversity).
- Development of clean cooking fuels and rural electrification.

Detailed costing of the above activities is contained in Annex 5.

LONG-TERM STRATEGY (2015-2025)

The GoSL is committed, through its structural, institutional and private sector development initiatives to fully achieve its energy access goals by 2015 in line with the ECOWAS White Paper on Access to Energy Services by Rural and Peri-urban populations. These goals include:

1. 100% of the population should have access to modern cooking fuels.
2. At least 60% of the rural population should have access to fuel for motive power applications to boost their productivity in various economic activities.
3. At least 60% of the population should have access to individual electricity supplies. This translates into:
 - a. 100% of the urban and peri-urban population and
 - b. 33% of the rural population
4. 60% of rural settlements should have:
 - a. Modernised basic social services – healthcare, drinking water, communication, etc.
 - b. Access to lighting, refrigeration, audiovisual and telecommunications services, etc.
 - c. Decentralised approaches for the provision of the above services

Beyond meeting these goals the GoSL is keen to integrate its electricity grid through interconnection with neighbouring countries facilitating purchase of energy from generators outside Sierra Leone through the West Africa Power Pool. Government is already in discussions with ECOWAS's West African Power Sector Regional Regulation Project to facilitate its future participation in the pool.

At this stage it is expected that, in line with the proposed/likely market structure developments, and using international and regional restructuring models as guides to developments in Sierra Leone, NPA will be divested and a new company created (NPCo).

Areas for Development Partner Support in the Long-Term:

- Technical assistance in design and implementation of regional interconnection strategies – potential benefits of linking to the West Africa Power Pool
- Development of clean cooking fuels and rural electrification.

Detailed costing of the above activity is contained in Annex 6.

CONCLUSIONS – MAINTAINING GROWTH THROUGH DEVELOPMENT PARTNER SUPPORT

1. Given the enormity of the challenges facing the energy sector as a whole, and the power sector in particular, it is clear that the GoSL remains dependent on its development partners to maintain the momentum for development and future growth.
2. This note has served to outline current initiatives, future targets, and establish a clear road map/action plan for the sector.
3. Many of the areas defined already receive donor support; however successful completion, meeting MDGs and supporting economic development is contingent on resources continuing to be made available.
4. The PRSP Annual Progress Report recognized that, 'supportive infrastructure is integral to the attainment of food security and job creation in the medium to long term..... these sectors (particularly roads and transportation; energy and power) have the potential to transform the economy, accelerate growth in the productive sectors and rapidly improve market access, as well as increase access of the rural poor communities to income generating activities'.
5. It is the sincere desire of this government to fulfil this supportive role and we call on our development partners for their continued support.