NPG
NUCLEAR POWER GHANA

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2020
ANNUAL REPORT

Sponsoring Institutions:

VOLTA RIVER AUTHORITY

GHANA ATOMIC ENERGY COMMISSION

BUI POWER AUTHORITY

Ministry of Energy

BOARD OF DIRECTORS

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Dr. Robert Sogbadji
Member

Mr. Franklin Addai
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Hon. Patricia Appiagyei
Member

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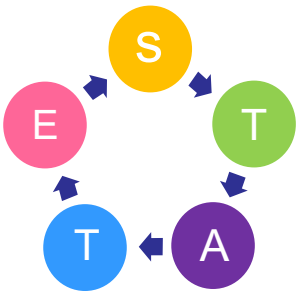
VISION

To be a regional leader in the provision of affordable, reliable and sustainable low-carbon emission energy.

MISSION

To build Ghana's Nuclear Power Plants and to produce affordable electricity in a Safe and Environmentally friendly manner for socio-economic development.



OUR CORE VALUES

SAFETY

The Safety of people and the environment take precedence over all other requirements and objectives.

TRANSPARENCY

We conduct our activities with complete openness.

ACCOUNTABILITY

We are fully aware of our duties and hold ourselves accountable for our actions.

TEAMWORK

We believe in cooperation and put team above individual performance

EXCELLENCE

We have strong commitment to good quality and innovation.

Introduction

Electricity has played a vital role in the transformation of human society. Machines that operate on fossil fuel and electricity have revolutionised production, enhanced productivity, and improved the world economy. The sources of power for such endeavours were initially considered based on available resources and price, oblivious of other sensitive and essential subjects such as climate change and sustainable development.

Climate Change & Sustainable Development Goals (SDGs)

With massive industrialisation resulting from technological advancement, the world, at a point, was conscious of the challenges posed by climate change and sustainable development issues. These issues have at their core inter-generational equity that requires the current generation not to compromise the future generation's access to resources and their use.

It, therefore, became imperative that States review their activities in the light of sustainable development and climate change goals. The minimisation of carbon dioxide and other greenhouse gases in the atmosphere and an attempt to limit the increase in world temperature became a critical global conversation.

Countries have, consequently, agreed on an international plan for the commitment to the processes of reducing the effects of climate change by embracing the 17 Universal SDGs. The initial 'Intended Nationally Determined Contributions (INDCs)' pledges to be progressively reviewed every five years from 2020 captures the commitment of States to the SDGs.

A report by the International Council for Science in 2017 titled 'A Guide to SDG Interactions: from Science to Implementation' reviews the SDGs and

indicates the interconnectivity between goals 7 and 13. Whilst goal 7 aims at ensuring access to affordable, reliable, sustainable, and modern energy for all, goal 13 requires States to take urgent action to combat climate change and its impacts.

The effects of these goals have significantly influenced global conversations and actions and led to the reconsideration of energy policies to factor greenhouse gas emission into electricity production options. The objective is to drastically reduce emissions from the burning of fossil fuel by promoting a considerable increase in low-carbon emission energy sources and keep global warming below 2 degrees Celsius as required by the Paris Agreement.

Nuclear Power / Nuclear Power Ghana (NPG)

Within the Power generation circles, issues on Sustainable Development, Climate Change, Affordability, Reliability and Resilience criteria have brought the Nuclear Power conversation to the front burner.

Nuclear Power has one of the lowest impacts on the environment because it produces no harmful greenhouse gases. It has the highest capacity factor, requires relatively less area and a lower mass of fuel to generate a large amount of electricity. Again, it has the potential to substitute or complement primary baseload sources.

In 2007, then President of the Republic of Ghana, His Excellency John Agyekum Kufuor, set up a committee chaired by Professor Daniel Adzei-Bekoe to explore the possibility of Ghana using nuclear energy as an alternative Base-load source of power.

Following the Professor Adzei-Bekoe Committee's recommendations, the Cabinet, in 2008 decided to include Nuclear Power into Ghana's Energy Policy and Strategy. The then Government's commitment to improve the country's energy security provided leadership and resources to facilitate the nuclear power programme.

To sustain the natural progression of the country's technological energy advancement, subsequent Governments supported these efforts which birthed the Nuclear Power Ghana (NPG), the Owner/Operator of Ghana's Nuclear Power Plant.

The NPG, with primary responsibility for Safety and Security, also has a direct mandate for Project development, Site selection, Construction, Operation and Maintenance as well as Decommissioning.

Accordingly, the Board of NPG is focused on providing relevant resources to build a strong safety culture and resilient management system that adheres to standards in the planning and development of the 19 Infrastructural issues and related processes.

Review of 2020 Activities

Under the year of review, the Board continued to lead efforts to meet NPG's budget for critical activities; engage with stakeholders such as relevant Ministries, the Nuclear Regulatory Authority (NRA) and other Industry players.

A review and subsequent submission of the Programme Comprehensive Report (PCR) to the Government and Cabinet marked another landmark in Ghana's Nuclear Power Programme. The report is to enable the Government to communicate its final commitment to the Nuclear Power Project.

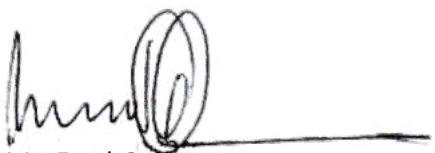
Further, NPG has successfully developed a 5-Year Work Plan for Phase 2 activities. The Plan is anchored on four strategic priorities which will be critically examined for implementation. These are: Engagement with the Government for selection and subsequent contracting of a Vendor/Strategic Partner; Data collection for preferred site selection and related activities; Community engagement and stakeholder management for public and community support; and development and implementation of policies, strategies, and procedures for Phase 2 project execution activities.

Related to Vendor/Strategic Partner selection, the Board is determined to ensure that NPG concludes the Cost and Revenue projection feasibility report to assist the Government effectively establish the financial viability of the project. The recommendations in the report will provide sound economic analysis base and options for successful contract negotiation with prospective Vendors/Partners.

Conclusion

The Board will continue to engage the Government on the direction for the Nuclear Power Project, explore all available opportunities to build a highly competent workforce equipped with excellent safety knowledge and skills, and ensure compliance with international standards.

It is the conviction of the Board that with the current rate of support, NPG will be capable of meeting its targets for Phase 2 and maintain the momentum to enable Ghana to deliver its first Nuclear Power Plant by 2030.



Mr. Fred Oware
BOARD CHAIRMAN

Nuclear Power Ghana (NPG) was established in 2018 as the Owner/Operator of Ghana's first proposed Nuclear Power Plant. In July 2019, NPG was duly registered under the Companies Code of Ghana as a Limited Liability Company. NPG is housed at BPA Heights in Accra.

NPG's activities commenced when some selected staff of Volta River Authority (VRA), Bui Power Authority (BPA), and the Ghana Atomic Energy Commission (GAEC) were identified and seconded to form its initial core staff with Ing. Richard Nii Agyemfra Badger, Deputy Chief Executive (Engineering & Operations) of the VRA, as the first Executive Director.

Considering the scope of NPG's operations and nationalistic nature of the Nuclear Power Programme, NPG associates and partners with several international and national organisations such as the International Atomic Energy Agency (IAEA), Environmental Protection Agency (EPA), Association of Ghana Industries (AGI), Ghana Grid Company (GRIDCo), Ghana Institution of Engineering (GhIE), Energy Commission, Geological Survey Authority (GSA), Ghana Statistical Service (GSS), and several other state agencies to achieve the objectives of the Nuclear Project.

The overall policy decision, direction and strategy of NPG is exercised by a 7-member Board with Mr. Fred Oware, as the Board Chairman. The members include Heads of sponsoring institutions involved in Ghana's Energy Sector.

NPG is headed by an Executive Director, who ensures that its mission, objectives, and Board directives are effectively promoted to deliver Ghana's first Nuclear Power Plant.

Under the current Phase Two of the Programme, the Executive Director directs strategies that support and enhance organisational operations and supervises the four key Departments that form the current transitional organisational structure, namely: Project Management, Engineering Development, Partnerships and External Relations, and Corporate Services.

Key to its business tenets, NPG is committed to Safety, Transparency, Accountability, Teamwork, and Excellence (STATE) as cherished values.

Corporate Responsibilities

01	02	03
❖ Prepare the feasibility study for the first Nuclear Power Plant.	❖Liaise with the Nuclear Regulatory Authority to ensure conformity to regulations	❖Review potential Nuclear Power Plant vendors.
❖Complete site selection, site characterisation and environmental impact assessment studies.	❖Manage interfaces with Stakeholders	❖Manage and supervise the construction of the first Nuclear Power Plant.
❖Ensure the proposed grid design provides a sufficiently reliable grid connection	❖Implement local content strategy for the Nuclear Power Programme.	❖Operate, Maintain and Decommission Nuclear Power Plant.

19 Infrastructure Issues, 3 Phases, 3 Milestones

INFRASTRUCTURE ISSUES

1. National Position
2. Nuclear Safety
3. Management
4. Funding and Finance
5. Legislative Framework
6. Safeguards
7. Regulatory Framework
8. Radiation Protection
9. Electrical Grid
10. Human Resource Development
11. Stakeholder Involvement
12. Site and Supporting Facilities
13. Environmental Protection
14. Emergency Planning
15. Security and Physical Protection
16. Nuclear Fuel Cycle
17. Radioactive Waste
18. Industrial Involvement
19. Procurement

Phase 1
- What Kind of Human Resources are needed?
- How much will it cost?
- Can we find access to finance?
- What are we going to do with the waste?
- Is it safe?
- Can accident be managed?

→ **Milestone 1**
Ready to make a knowledgeable commitment

Phase 2
- Developing the institutions, Building expertise /capabilities.
- Liaising with Stakeholders, Developing Regulatory Framework, Electrical grid studies/upgrade, Procurement, Site preparation, Contracting

→ **Milestone 2**
Ready to build/negotiate a contract for the first Nuclear Power Plant

Phase 3
- Ensuring safety construction while preparing for Operation
- Getting ready for fuel arrival on site
- HR and Building competence
- Regulator ready for review of the construction license application and inspection
- Project Management, control of cost and scheduling during construction

→ **Milestone 3**
Ready to commission and operate the first Nuclear Power Plant

The Programme Comprehensive Report (PCR) provides high level answers to all these questions and allow a knowledgeable commitment.

DATE	EVENT
1963 - 1967	Ghana's 1st Reactor Project Launched: Construction of 2MW Soviet Research Reactor started
	Ghana Atomic Energy Commission (GAEC) established
	Reactor project suspended after the overthrow of Government
	Government invited Sir John Douglas Cockcroft and IAEA to review Ghana's Reactor Project
	Ghana's Reactor Project reviewed by Sir Cockcroft and report noted: " In view of the capacity of the Volta Hydro Electric Project, for some 20 years to come, a reactor is unlikely to be necessary for the purpose of producing power"
	Reactor Project cancelled and GAEC shut down
1973 - 2006	GAEC revived to continue R&D in Nuclear Science and Technology
	Effort made to acquire 1MW Research Reactor from the Federal Republic of Germany truncated due to 1973 coup d'etat
	GAEC commissioned a Chinese built 30kW research reactor under IAEA Technical Cooperation Agreement in 1995
	GAEC & University of Ghana, with the support of IAEA, established the Post Graduate School of Nuclear and Allied Sciences in 2006
	A minor Power crisis experienced in 1993
2007 - 2012	Presidential Committee (Professor Adzei Bekoe Committee) established to report on feasibility of introducing Nuclear Power into the country's energy mix
	Committee's report recommended Government to pursue Nuclear Power inclusion
	Cabinet decided to include Nuclear Power in the energy mix
	Nuclear Energy included in National Energy Policy and Strategy
	Ghana Nuclear Power Programme Organisation (GNPPO) established to oversee the development of the Nuclear Power Programme
	National working group on Nuclear Power Infrastructure development established
2013 - 2015	Working groups established at GAEC to focus on nuclear programme infrastructure
	Nuclear Power Centre (NPC) established at GAEC as the Technical driving force for GNPPO
	IAEA experts visited Ghana to develop a better understanding of the Nuclear Power Infrastructure development
	Roadmap for Nuclear Power Infrastructure development in Ghana established
	ACT 895, 2015 enacted. Nuclear Regulatory Authority established for an effective independent Nuclear Regulatory regime

DATE	EVENT
2016 - 2017	NPC upgraded to an institute, 'Nuclear Power Institute'
	Ghana requested for IAEA integrated Nuclear Infrastructure Review (INIR) Mission for Phase 1 of programme development
	Ghana submitted Phase 1 INIR Mission Self Evaluation report to IAEA for review
	Phase 1 INIR Mission conducted by IAEA
	IAEA submitted Phase 1 INIR Mission Report to Government
	Ghana developed Phase 1 Integrated Work Plan (IWP) with IAEA
	Stakeholder consultation on Owner/Operator held
2018 - 2019	GNPPO addressed INIR Phase 1 recommendations and suggestions
	GNPPO submitted a Memo to Cabinet on the establishment of Owner/Operator organisation
	Nuclear Power Ghana (NPG) as Owner/Operator organisation established
	Four candidate Sites identified
	Ghana requested for IAEA Phase 1 INIR Follow-up Mission
	Phase 1 INIR Follow-up Mission conducted by IAEA
	Phase 1 Nuclear Programme Comprehensive Report (NCR) developed and submitted

Introduction

While the World energy demand continues to increase, the will and power to find the right energy mix that responds to contemporary sustainable development is the burden of each country.

Renewable Energy is expected to see significant deployment and expansion. However, the key questions on its variable nature with serious implications for reliability and sustainability, remain unanswered.

Ghana's commitment to increase the renewable ratio of its electricity generation mix has intensified in the recent years.

The quest for an alternative base-load power plant that supplies reliable, affordable, and sustainable electricity to boost industrial activities, has provided the Nuclear option for Ghana.

Government's commitment to improve the security of Ghana's Energy, in particular electricity, necessitated the revision of Dr Nkrumah's Nuclear Power agenda in 2007.

Led by Professor Adzei-Bekoe, the Committee recommended that a decision by Ghana to acquire Nuclear Power technology would be a natural progression in the country's technological advancement. The approval of the Committee's report and subsequent governments' efforts in same culminated in the establishment of Nuclear Power Ghana (NPG) in 2018.

NPG's Mandate & Operations

NPG, as the Owner/Operator, has the single responsibility to ensure that, beyond 2030, a Nuclear option alternate base-load is operational for the country's developmental needs.

NPG as Owner/Operator organisation has the responsibility to execute Nuclear Power Project development in the country including issues such as Siting, Grid infrastructure assessment for compatibility, Vendor selection, Licensing, Construction, Commissioning, Operation and maintenance, life management and decommissioning of Nuclear Power Plant.

NPG therefore, is the heart of Ghana's Nuclear Project and has embraced the challenge to deliver on target.

Since its establishment in 2018, NPG provided the needed support to the Ghana Nuclear Power Programme Organisation (GNPPO) to complete all outstanding Phase 1 activities as outlined in the International Atomic Energy Agency's (IAEA) nuclear infrastructure development requirements.

There has been a steady progress of planned activities of Phase 2. We are fully aware that the ultimate responsibility for safety, security and safeguards rests with us.

Management has prioritised safety and seeks to ensure the development and adherence to strong safety culture and empower staff in this direction.

2020 Achievements

Notwithstanding the challenges of Covid-19, NPG has pursued its Vision and successfully completed key milestones, notably, engagement with communities for installation of Seismic equipment at identified candidate sites and subsequent siting activities, the development of a 5-year Phase 2 work plan for nuclear project infrastructure development, a risk management framework document for the entire lifecycle of the nuclear project and signing of MoU with Ghana Journalist Association (GJA) to promote and sustain Media relations and management, and public education on Nuclear Power Project.

The various Departments have completed (or almost completed) key initiatives, including an Integrated Management System that promotes a strong safety culture, a Procurement and a Project Life-cycle Management Manual, Nuclear Fuel Cycle (NFC) Guidance document, a Position Paper on Grid & Nuclear Integration and other grid related issues, initiated the development of a comprehensive Human Resource Plan and Knowledge Management (KM) Manual, etc.

Matters of importance to our stakeholders have a direct impact on our ability to create the needed value and to execute our strategic objectives for Ghana's Energy Mix. As such, these matters noted in the 5-Year Work Plan are considered in our strategic planning to influence the determination of all relevant matters.

Over the period under review, Communications and Stakeholders Management initiatives were implemented to promote visibility, manage information and knowledge, and ensure transparency and acceptance of the Nuclear Power Project. NPG's Media training and involvement campaign "Establish Energy Desks" has yielded noticeable efforts from the various media organisations with many Journalists enthusiastic to engage in Nuclear Power issues. It is worth emphasising that NPG in collaboration with The Institute of Statistical, Social & Economic Research (ISSER) of the University of Ghana has completed its preliminary reports on "BASELINE NATIONWIDE SOCIAL AND ECONOMIC SURVEY ON THE GENERATION OF ELECTRICITY USING NUCLEAR TECHNOLOGY IN GHANA" which is being reviewed and finalised for public presentation. The report is to understand stakeholders' views, assess awareness and knowledge levels, and interest in Nuclear Power Programme / Project that provides additional power to the country's generation mix.

Capacity Building and Our People

NPG is pursuing efforts to adequately prepare skilled workforce and learners' intake to build and retain strong skills development and commitment that guarantees the required skills for the organisation's needs.

NPG is also committed to a robust best-industry organisational structure to build a strong pipeline of leaders that can execute the organisation's strategy and champion our responsibilities and values.

We have focused our efforts on ensuring that despite the Covid-19 challenges, our existing workforce is adequately supported in their developmental needs via e-learning, especially IAEA organised training programmes. Discussions have been initiated to set good internal communications benchmarks to promote proactive knowledge exchange and sharing, identify high-performing individuals as well as developmental needs among staff.

Three staff from our sponsoring institutions are pursuing various Postgraduate

programmes in Nuclear Engineering abroad.

The overall target of our current proposed Organisational Structure is to manage talents in a sustainable manner, perform succession planning for critical workforce segments and actively manage talent pools and careers in line with our workforce plan and transformation objectives.

Guidance and training from the VRA Corporate Planning Team on the Balanced Score Card Performance Management concept is in progress to enhance efficiency of targets deliverables.

We hope to implement an overall skills strategy that will serve as the foundation for a skills audit to influence a resourcing plan, now and in the future to retain critical skills using a targeted employee value proposition.

Challenges

In 2020, the restrictions imposed by Covid-19 affected some key deliverables which impacted critical decision-making steps including National Position, Training and Stakeholders engagement activities for siting programmes.

Even though many of NPG's current employees, on secondment from our sponsoring institutions; the Volta River Authority (VRA), Bui Power Authority (BPA) and Ghana Atomic Energy Commission (GAEC), have expressed concern with their job progression and security, these issues and others as identified are being managed to reduce the uncertainty affecting morale.

Looking Ahead

Guided by the global threat of climate change, the expected progressive increase in industrial electricity demand, and the energy security concerns raised by our stakeholders, NPG is poised to work harder amidst the Covid-19 restrictions.

S. Yamoah (PhD)
EXECUTIVE DIRECTOR

The critical Infrastructural issues of Phase 2 as identified, will be rolled out in four strategic priorities namely: engaging Government on National Position/Vendor Selection/Contracting approach/Funding & Financing models; data collection for Site and Supporting Facilities; Community engagement and Stakeholder management for education and information to gain public and community support for the project and developing policies, strategies, procedures and programme documents as well as the necessary human capacity development to guide the execution of activities in Phase 2 and beyond.

Conclusion

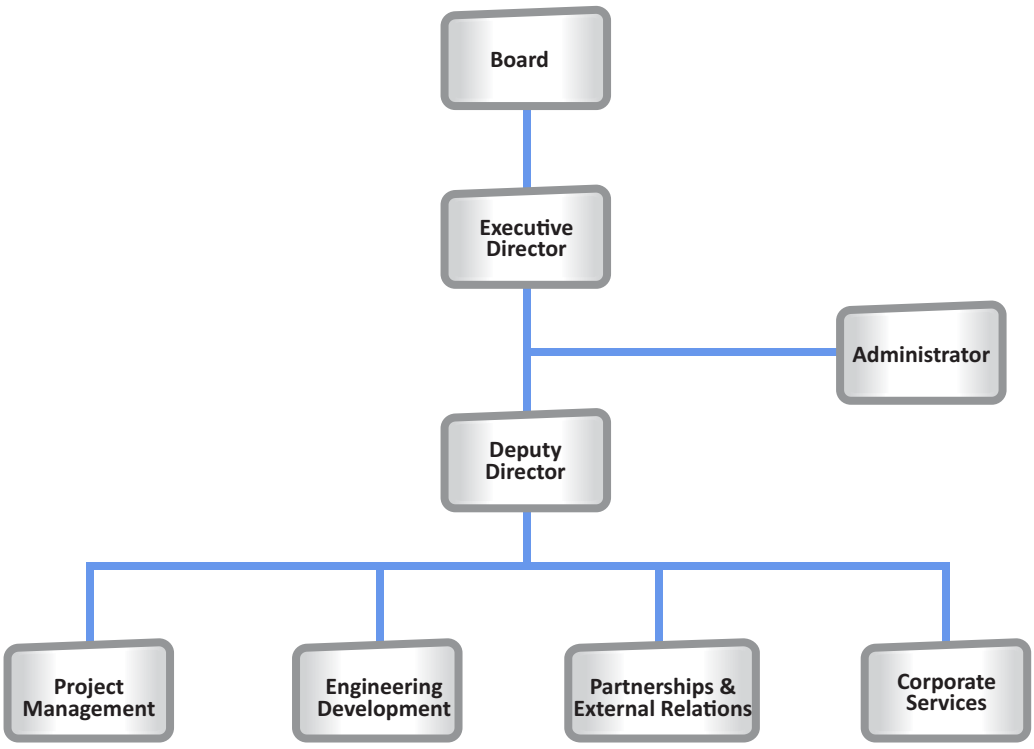
We are grateful to the Board for the trust, support, and commitment. We have every confidence that working with a strong, focused Management team, we will be able to execute Ghana's Nuclear Energy agenda for Industrial growth and development. We look forward to greater working relations to strengthen the enthusiasm of our team to achieve our set targets.

I am equally indebted to my entire staff at NPG for their resilience and commitment to duty. Initiatives are in place to build employee morale and give employees an opportunity to provide feedback to our leadership.

NPG's proposed value proposition will focus on the value and benefits provided by the organisation in return for the skills, capabilities and experiences contributed by employees.

I therefore, urge all staff to brace-up and continue with the 'can do spirit' as we thrive to build Ghana's first Nuclear Power Plant.

I wish to assure all that, NPG will continue to build on the foundation of the year under review to deliver the most relevant preferred base-load power, Nuclear Power, which has over 90% of Plant availability to further strengthen our electricity generation mix.



Corporate Services

- Information Technology (IT)
- Finance

Partnerships and External Relations

- Communications (Internal & External)
- Stakeholders Management
- HR

Project Management

- ERM
- Management Systems
- Legal Compliance
- Recruitment & Training
- Contracting
- Procurement
- Document Management & Control
- Cost Control and Scheduling

Engineering Development

- Site Studies & Infrastructure
- Environment Compliance
- Emergency Response Planning & Readiness
- Nuclear Fuel & RAD Waste
- Recruitment & Training
- Monitoring and Reporting
- Safety, Security & Safeguards
- Radiation Protection
- Compliance (Grid)
- Local Industries Readiness Programme
- Legal Compliance

STRATEGIC REPORTS

The Executive Directorate, headed by the Executive Director, superintends the total activities, operations, and programme of NPG. It also ensures that organisational goals are achieved and positive relationships with internal and external stakeholders are sustained and maintained.

Further, the Directorate facilitates and synchronises the activities of the four (4) key Departments that form the current transitional organisational structure, namely: Corporate Services, Project Management, Engineering Development and Partnerships and External Relations.

The Executive Director (in tie) with some NPG Staff

The Corporate Services Department which consists of Administration, IT, and Finance are part of the Executive Directorate and perform roles within the current scope of the Project Phase.

During the year under review, the Directorate initiated and executed some critical activities in line with the Phase Two requirements, namely:

8.1.1 Programme Comprehensive Report (PCR)

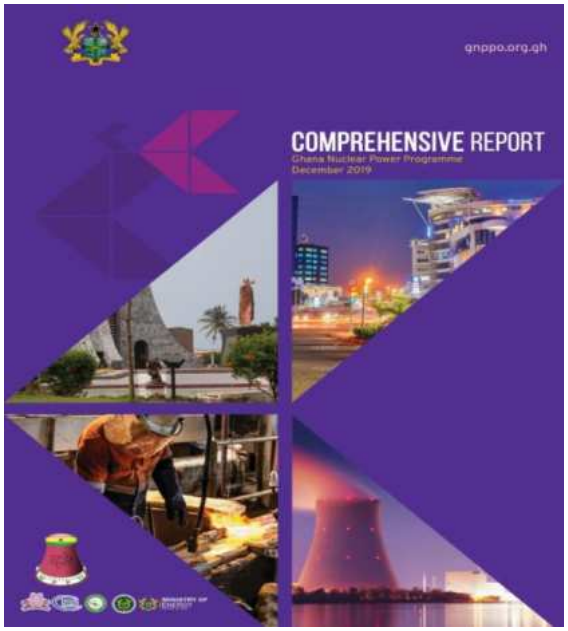
The Programme Comprehensive Report (PCR) on Ghana's Nuclear Power Programme was developed jointly with GNPPO technical body, the Nuclear PowerInstitute (NPI) and submitted to Government and Cabinet through the Ministry of Energy (MoE) and the Ministry of Environment, Science, Technology and Innovation (MESTI).

Principally, the PCR seeks Cabinet's adoption of the Phase 1 and requires Government to publicly communicate its intention on the Nuclear Power Programme and way forward.

As part of the review process, a team led by the Minister for Environment, Science, Technology and Innovation made a presentation to Cabinet on the content of the PCR.

Subsequently, Cabinet constituted an Inter-Ministerial Committee to address its recommendations, analyse the cost structure, and financial aspects of the Nuclear Power Project for their further action. The Minister for MESTI, Professor Kwabena Frimpong-Boateng, Chairman of the Committee, initiated plans to complete the review work as requested.

To provide timely support for the Committee's work and recommendation for Cabinet's consideration, NPG is working on the issuance of a Term Sheet, ie. Request for Information (RFI) to potential vendors.



NPG expects to evaluate the elicited responses from the proposed vendors to provide the basis on the cost structure and the financing option, and selection of a vendor for the Nuclear Power Project.

8.1.2 Development of 5-Year Work Plan for Phase 2

A 5-Year Work Plan for the Nuclear Project Infrastructure Development activities have been developed for presentation to the Board for review and subsequent approval.

The Work Plan provides a framework to Management on the level of efforts and collaborations required.

It also outlines a comprehensive and integrated plan on the required key activities that must be implemented, monitored, and mandatorily completed in the Phase 2 of the Nuclear Power Project.

A total of 271 tasks have been identified and cascaded to produce 41 unique deliverables in the form of Reports, Strategy Papers, Policies, and Procedures; some of which are currently at different stages of progress.

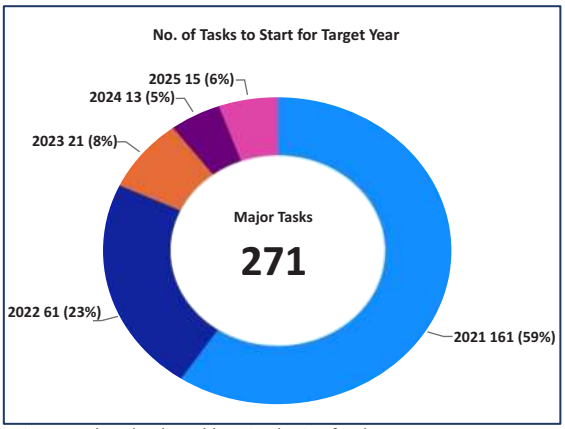


Figure: Task and Deliverables Distribution for the 5-years

Further, the 5-Year Work Plan also highlights the major risk factors which could impede the effective implementation of the key activities.

These factors include lack of funds and financing, delay in vendor selection decision, delay and or inability to identify the appropriate qualified staff for competency development and experience, delay in regulatory decisions and infrastructure, and a change in Government's Energy policy and focus.

8.1.3 Development of Nuclear Power Project Risk Matrix

Under the project Risk matrix, risk categories have been identified, defined, and mapped out to assist NPG to focus on the highest priority risks and assign appropriate resources. Since the matrix also provides consistency in prioritizing risks, various risks as identified will be monitored during the project execution.

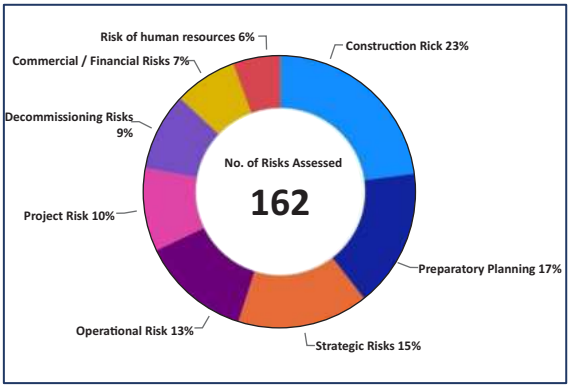


Figure: Percentage distribution of risks per risk category

8.1.4 NPG's Organisational Structure

The execution and delivery of key milestones in the project with its associated dynamic nature during each Phase, necessitates the reorganisation of NPG's organisational structure to ensure effective delivery and achievement of targets.

A draft of a reorganised organisational structure to provide timely and expertise direction on critical project activities with defined management roles and responsibilities up to the point of signing a Contract has been developed for Board's review and approval.

8.1.5 Review of Public Perception Survey

The Institute of Statistical, Social and Economic Research (ISSER) submitted two draft field reports on Household and Industrial surveys for review.

The reports are outcome of Baseline Nationwide Social and Economic Survey conducted on the Generation of Electricity using Nuclear Technology in Ghana.

The reports are being reviewed by the technical team from NPG and the Nuclear Power Institute (NPI). Review comments would be submitted to ISSER to incorporate into the final report expected before the end of the 2nd quarter of 2021.

8.1.6 2021 Budget

The 2021 budget was prepared based on the following three (3) identified significant variables that would determine the progress of Phase 2 activities:

- Timely confirmation of the preferred Site, availability of technical data to establish Plant design and construction.
- Suitable choice of strategic Vendor to partner NPG for the project.
- Timely identification, recruitment and competency building of qualified staff.

The budget was presented to the Board in November 2020 for review and approval was received.

8.1.7 Staffing and Staff Development

About 78% of NPG's current staff are on secondment from the three sponsoring institutions.

Management has initiated steps to resolve issues of job progression, security and other uncertainties arising from the secondment of staff from the sponsoring institutions.

In addition to the current six contract staff supporting various ongoing activities, Management plans to recruit a minimum of four people (including a driver) by mid-year of 2021.

8.1.8 Training and Workshop

The constraints imposed by the Covid-19 pandemic affected some planned training programmes. Nevertheless, the International Atomic Energy Agency (IAEA) held some virtual training events on useful subjects that provided adequate learning opportunity for our staff.

Currently, three of our staff (one female and two males) are pursuing various Nuclear Engineering Post Graduate programmes in China. One is expected to complete in 2021 and the other two in 2022.

Some initiatives are being confirmed to promote proactive internal knowledge exchange and sharing among staff of the various Departments.

The Corporate Services Department comprises of Administration, Finance, Information Technology (IT) and Legal service functions under the Phase 2.

8.2.1 Information Technology (IT)

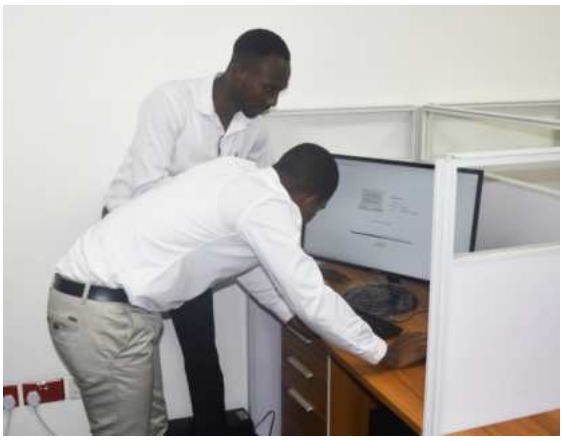
The IT Section is responsible for developing, managing and improving NPG's Information Technology (IT) infrastructure. The Section provides support services to staff and departments, assist staff with various functionalities and the use of computer and related systems, create, and manage a corporate Website and facilitate the deployment of social media blog for NPG's activities. A strategy to digitise NPG's documentation and information management systems is a work in progress. Various processes and procedures have been developed and the IMS and IT Units are working closely together to automate the systems currently being manually implemented.

The IT Section collaborates with the Bui Power IT Department to integrate and streamline network security and regularly ensure controls across our office operations for improved network efficiencies.

The synchronisation efforts of NPG's email system with the Volta River Authority's 365 Windows is progressing steadily.

As part of staff sensitisation on Cyber Security threats, a One-day Workshop was held to improve staff knowledge and introduce them to current trends in Cyber security.

With the Phase 2 requirements, focus will be applied to migrate to the digital utility model for our future communication and information management; mitigate against cyber security threats; efficiently promote self-service; develop and execute plans for emergency on network (LAN), Wide-Area Network (WAN) connections and power loss; develop processes for the periodic backup of data for the purpose of data recovery; and regulate policies that guide all IT activities.



Installation of computer software by staff of the IT section

8.2.2 Finance

The Finance Section provides financial services for the organisation including budgets, financial reports, and the facilitation of all internal transactions.

It plans and makes appropriate payments for every expenditure incurred as it implements various activities in Phase 2 to ensure efficient financial management and control necessary to support current activities.

It takes responsibility for and manages receipt of all cash inflows from sponsoring institutions to ensures that there are enough funds available on NPG's account to meet the day-to-day running of the company.

The finance section also takes charge of payroll system of six current contract staff.

The Unit has prepared and submitted the 2021 budget to the Board, with forecasts, financial analysis and report for review and approval.

This Department consists of Communications & Stakeholders' Management and Human Resources Development Sections.

8.3.1 Communications and Stakeholders Management

The Communications and Stakeholders Management Section exists to establish, coordinate, and manage all internal and external communications, Stakeholders Engagement and Public and Industry Relations.

In view of the Phase 2 activities, the Section focused on the following areas during the period under review to promote visibility, manage information and knowledge, strengthen capacity, and build evidence base for our Nuclear Power Programme / Project:

8.3.1.1 Development of Communication Plan

A five-year Communication Plan to provide information, educate and address the diverse opinions and needs of our publics was developed from a Communication Strategy draft and submitted to the IAEA for review.

During the third quarter, a virtual meeting was organised to discuss the details of the review comments which were subsequently incorporated and would be ready for sign-off by the 2nd quarter of 2021.

8.3.1.2 Media Relations and Public Education Programmes

NPG and the Ghana Nuclear Power Programme Organisation (GNPPO) jointly signed a Memorandum of Understanding (MOU) with the Ghana Journalists Association (GJA) to facilitate expert discussions on all Nuclear Power and related issues, undertake periodic evaluation of identified media engagements / activities for feedback and subsequent planning, promote the establishment of "Energy Desks / Platforms" within various Media institutions, and to collaborate in identifying required training for journalists on Nuclear Power infrastructure development issues.

The Executive Director of NPG (right) & President of GJA (2nd from right) exchange signed MOU documents

To further strengthen the knowledge level of journalists, promote positive social influence and reward outstanding performance of the media on Nuclear Power issues, NPG instituted the "NUCLEAR STAR AWARD" as part of the GJA's Annual Awards programme.

To contribute to a greater understanding of the project and consequently a greater acceptance, various public education programmes were held on some selected TV Stations to explain the basic technology and working principle of the Nuclear Power Plant, the safety requirements and responsibility, and the socio-economic impacts and benefits of nuclear power.

NPG also made appearances on various media platforms to explain the nuclear power rationale and the safe application of nuclear science & technology principles and safety requirements. The platforms include GTV's Current Affairs Talk Show "Moomen Tonight", TV3 and Onua FM.

About five interviews were commissioned and published on Graphic 360 Online platform and in Business & Financial Times (B &FT).

8.3.1.3 Workshop for the Media

A Two-Day Communication Workshop was held for 40 selected journalists from 19 media institutions on the theme "Ghana's Power Generation Plan and Current Options to Accelerate Industrial Development".

The focus was to provide a balanced information and provide dialogue on the various dimensions of Ghana's Power Sector issues for ease of effective News content building.

A section of Key Personalities during Media Workshop

Resource persons were drawn from the Volta River Authority (VRA), Association of Ghana Industries (AGI), Ministry of Energy (Renewable & Nuclear Desk), Bui Power Authority, Nuclear Power Institute and two Communication trainers.

Dr. Stephen Yamoah making a presentation at the Media Workshop

8.3.1.4 Partnership with Ghana News Agency (GNA)

To provide a comprehensive communications management strategy, a courtesy call was paid to the Chief Executive Officer and his management team.

Identified areas of collaboration include timely information link to the various media institutions, establishment of 'Energy Desk' and a hook on GNA's new Multi-Digital Platform for public services activities. A MOU draft submitted to the Legal team for review would be completed and implemented in 2021.

To ensure a transparent, honest and well-balanced relationship with our stakeholders including policy makers, government, the surrounding communities and other stakeholders, we are readily available to dialogue and keep them informed about project status, progress and potential impact.

8.3.1.5 Stakeholders' Management

NPG sponsored and participated in the Ghana Economic Forum, 2020, organised by the Business and Financial (B&FT). In collaboration with the MOE, the second day of the forum dubbed 'Energy Day' provided a platform for some key stakeholders in the Energy Sector including Nuclear Power Ghana to share their stories and plans.

Panelists at the 2020 Ghana Economic Forum

The Forum provided a good platform for exchange of ideas and networking with several personalities and institutions. The Senior Minister, Hon. Yaw Osafo Marfo, who chaired the Energy Session acknowledged the recommendations presented during the session for Government's consideration.

A section of NPG staff during the 2020 Ghana Economic Forum

8.3.1.6 'Site Community' Engagements

Based on Phase 1 Sites selection processes, four candidate sites were identified for further action.

During the year, various stakeholders' engagements were held in the four 'Candidate Site Communities' as part of the preparatory activities for the installation of the seismic equipment for monitoring earthquakes.

Group picture of NPG Team & Chief in the Central Region

Even though some initial challenges were encountered, the Chiefs, elders and people were re-engaged following the protocols on 'Community Entry'.

Chief Linguist addressing the gathering

Later interactions improved acceptability and Local Working Committees were inaugurated at the various Communities to improve information flow and dialogue.

Local Working Committee Members for one of the candidate sites

During the engagements, the team answered several questions on human safety, employment opportunities, education, and gender preferences.

Community women present during the community engagement in the Central Region

Further engagements and educational programmes planned for the 'Site Communities' would be rollout in 2021 for effective involvement agenda.

Dr. Stephen Yamoah, Executive Director, NPG, making his remarks at the gathering

8.3.2 Human Resources Development

NPG believes safety will be improved to a higher level if a highly qualified workforce is available, developed and maintained to support the security and sustainable operation of Ghana's Nuclear Power Plants.

The Human Resources Section aims to establish suitable and secured policies and procedures to attract, recruit and retain knowledgeable and skilled staff who have imbibed excellent safety culture in their activities.

For the period under review, the HRD has initiated the development of various key policies which are at different stages of completion for review. The draft framework on Code of Ethics, Conditions of Service and Scheme of Service are completed for review and submission.

In compliance with IAEA's Systematic Approach to Training (SAT) recommend-dations, the Unit is preparing a draft SAT guideline for NPG.

On the development of a Comprehensive Human Resource Plan, the scope of the Table of Content to which the document will be populated has been agreed on for further action.

Considering the number of personnel that would be required for the effective implementation of Phases 2 and 3, a preliminary human resource needs of NPG on workforce planning has been developed and would be presented to the Board for review and approval.

In view of the lead time required for training and other competency development, the manpower loading plan would ensure the sustainability requirements of competent human resource to address the extent to which NPG should timely and systematically recruit and provide requisite training to the staff for competency and capacity development necessary for the safe operation and maintenance of the Power Plant.

The Project Management Department is responsible for pre-construction planning activities such as contracting, tracking of project activities, procurement, document management and control, cost control and project scheduling, and ensuring adherence to nuclear quality assurance requirements.

The department is also responsible for the establishment of all management systems and developing or facilitating the development of various policies, strategies, and procedures for the implementation of Integrated Management Systems (IMS).

Some activities were undertaken during the period of review, notably:

8.4.1 Development of a 5-Year Procurement Plan

The 5-Year Plan aimed to establish a competent capability that enables NPG to knowledgeably prepare formal specifications for the services required, including quality standards in the service specifications and delivery, as well as procedures or audits to ensure suppliers have appropriate expertise and experience required to provide the service.

The Plan has been completed, reviewed and incorporated into the NPG corporate 5-Year Work Plan for implementation.

8.4.2 Development of Procurement Manual

The objective of the Procurement Manual is to provide a step-by-step procedure for NPG to undertake its procurement functions relating to the Nuclear industry and per the Ghana Public Procurement Act.

The Manual outlines the standards and procedures in the procurement of goods, works, and services within NPG as a Public Sector organisation and in particular for the Nuclear procurement cycle, from planning, initiation, and the final delivery of goods and services. It also covers performance and contract completion for pre-project activities, operations, and maintenance of the Nuclear facility.

The completed draft Manual was submitted to the IAEA in October for review, finalisation, and approval for implementation by the 2nd quarter of 2021.

8.4.3 Development of Retainership Agreement

In the year under review, it was noted that, Ghana's decision on a strategic Partner/Vendor requires an expert with adequate exposure to facilitate the many complex and interrelated issues of negotiation.

The Department, therefore, developed a draft Retainership Agreement for the recruitment of two Nuclear Power experts to provide advisory services that assists to secure the best deal for Ghana.

The draft agreement which provides the basis for the engagement of the leading experts, and the terms of reference to assist NPG, GNPPO and NRA through a Single Source Procurement option would be submitted to the Board for review and approval to enable NPG to proceed to PPA to seek approval for Single Source procurement.

8.4.4 Integrated Management System (IMS)

During the year under review, efforts continued with the development of specific processes/procedure/policies for Procurement, Siting, Data management and others.

In October 2020, NPG participated in an Integrated Management System (IMS) review mission.

This programme was held as a follow-up to the review mission held in January 2020. The main objective of the mission was to get advice and assistance from international experts in the development of a process based IMS that is appropriate for the owner/operator organisation in Phase 2 of nuclear power programme.

In total 16 documents and their associated templates/forms were submitted for review. Comments were received, discussed and incorporated.

NPG will continue with the development of, core, management and support processes for Phase 2 management systems needed for the functioning of NPG in the ensuing year with particular attention to the development of Knowledge Management and Quality Assurance/Quality control framework in compliance with regulatory requirements and IAEA's General Safety Requirements (GSR) Part 2.

The IMS Section is tasked to come up with initiatives on the use and implementation of developed policies, procedures and strategies to ensure effectiveness of NPG management system.

As part of efforts to digitise its processes, NPG has developed an IT-based budget tool to be used in improving its budgeting process and enhance the planning, prioritising, tracking and reporting of expenditure. The software will be tested in 2021 before full implementation commences in 2022.

Also, VRA has agreed to provide Microsoft Office 365 licenses to staff of NPG. NPG is currently working with the MIS department of VRA to iron out the modalities for migration onto the Microsoft Office 365 platform.

Some staff of the IT section working on NPG's process based IMS for Phase 2 activities

Under the current Phase, the Engineering Development Department is tasked to develop all technical project and plant specifications as required in infrastructural areas such as Reactor Technology Assessment, Site Selection and Development Works, Emergency Response Planning & Readiness, Nuclear Fuel Cycle and Radioactive Waste Management, Safety, Security and Safeguards, Radiation Protection, Environmental and Social Impact Studies, Grid Compliance, and facilitate local industries readiness programmes.

During the year under review, the Department implemented the following activities:

8.5.1 Siting and Environmental Activities

Three seismic monitoring equipment with financial support from IAEA on a cost sharing basis was procured for installation at the three communities where four candidate sites have been identified.

The technical team consisting of staff from NPG, NPI and Geological Survey Authority (GSA) has initiated the civil works for equipment installation activity in two communities in the Greater Accra and Central Regions.

NPG Team & Local Working Committee visit equipment installation site

Civil works is expected to be completed at all candidates' sites by end of the 2nd quarter of 2021 for the commencement of equipment installations by the equipment manufacturers, Nanometrics. The equipment when installed would be integrated into the national system which is managed by GSA.

Technical Team identifying GPS coordinates for equipment installation

For the supply and installation of Automatic Weather Station Equipment and Masts for monitoring meteorological parameters of the four candidate sites, it was noted that, even though financial arrangement was completed for the procurement process, the Public Procurement Authority (PPA) Single sourcing approval had expired. Initiatives to resubmit a request for PPA's approval will be carried out in 2021.

8.5.2 Development of various Policies, Manuals and Others

During the year under review, the development of several documents relating to Safety, Security, Project Life Cycle, and Grid commenced. Whilst some have been completed and submitted for approval, others are being reviewed, and a few others are at various stages of completion.

The Policies, Manuals and other Documents include NPG Project Life Cycle Management Manual; NPG Nuclear Security Policy and Manual for Vetting and

Screening applicants; Information Sensitivity Policy Document for protecting NPG sensitive information; NPG Safety Management System (SMS) and Nuclear Safety Policy; Document Classification Guidelines and Procedures, Nuclear Fuel Cycle (NFC) Guidance, Safeguard specific requirements provisions and features, Classes of Nuclear accidents and its Mitigation measures.

8.5.3 Grid Infrastructure Compliance

To ensure that the Grid Infrastructure is robust to accommodate the Nuclear Power Plant, a report on the status of Ghana's Grid Infrastructure is being compiled for an assessment and redress at every stage of the Nuclear Power Project.

The information compilation which is based on IAEA's Nuclear Energy Series No. NG-T-3.8 on Electric Grid Reliability and Interface with Nuclear Power Plants (NPP) is divided into the various stages of the Programme/Project development.

The current draft report which focused on requirements for Phase 1, will be submitted for review and approval.

The Department also started a review of Ghana's Grid Code requirements in comparison with that of other newcomer nations as well as countries already operating Nuclear Power Plant.

The review, when completed by the 2nd quarter of 2021, will guide the determination of Ghana's Grid code standards per the requirements for inclusion of Nuclear Power in the transmission system.

In collaboration with GRIDCo and NPI, a preliminary 'Grid Integration Study', was also conducted in 2019 to determine the readiness of the Grid System, and the required modifications that may be needed.

Our target for 2020 was to meet with GRIDCo to develop the 'Terms of Reference' for further Grid Studies to be conducted in Phase 2. Unfortunately, due to the Covid-19 restrictions, all such planned meetings with GRIDCo were suspended.

A section of Engineering Development Staff

FINANCIAL SUMMARY AS AT YEAR END 2020	
Income	**2020**
	GHS
Grants from VRA & BPA	1,224,832.73
Siting Expenses	45,073.00
Other Expenses	884,526.93
Total expenditure	929,599.93
Net Surplus	295,232.80
Non-Current Assets	53,667.64
Current Assets	1,049,992.61
Total Assets	**1,103,660.25**
Surplus	295,232.80
Retained Earnings	805,849.00
Current Liability	2,578.45
Total Equity and Liabilities	**1,103,660.25**

Income

The NPG presently derives its main source of income from the Volta River Authority (60%) and the Bui Power Authority (40%) respectively. The year under review saw a total inflow of GHS1,224,832.73 (One Million Two Hundred Twenty-Four Thousand, Eight Hundred Thirty-Two Ghana Cedis & Seventy-Three Pesewas) to support NPG phase 2 prefeasibility budgetary activities for year 2020.

Expenditure

Of the foregoing inflows, a total amount in the sum of GHS929,599.93 was expended on key capital and other administration expenses. Among the significant expenditure items are:

- Public Perception Survey - GHS600,000.00
- Communications, Media, and Publicity - GHS123,480.84
- Staff costs - GHS112,747.30
- Siting activities - GHS45,073.00

Assets

The organisation invested a total amount in the sum of GHS55,999.97 to procure laptops and projectors to ensure effective and efficient performance of its staff in the discharge of their duties.

10.1 Manpower Loading Plan

Not all required expertise and skills needed for project planning, development, execution, and resourcing are immediately available. Considering the lead time needed for competency development, NPG needs to identify and recruit the needed human resources to adequately plan their training, exposure levels and capacity development.

10.2 Position Paper on Grid and Nuclear Integration

In Phase 1 of the Nuclear Power Programme, GridCo assisted to conduct a preliminary Grid study to determine the readiness of the Grid system and the required modifications or addition needed.

The planned meetings to develop a term of reference for the detailed grid studies to be conducted in Phase 2 could not materialise due to the Covid-19 restrictions.

This initiative will be reactivated during 2021 to prepare the draft document and submit for review.

10.3 Local Industrial Engagement and Involvement Activities

The Local Industrial involvement process is expected to facilitate the identification and selection of qualified and reliable local suppliers for commodities, components, or services to the Nuclear related and/or Non-nuclear aspects of the Nuclear Power Project.

Although this activity is under the realm of GNPPO, it is also critical for NPG as it assesses potential suppliers to provide timely scheduled, at competitive prices and with appropriate quality assurance, commodities, components, and services for building and operating a Nuclear Power Plant.

The activities could not be carried out as a result of COVID-19. Measures are being put in place to undertake these activities in 2021, all other things being equal.

Four major strategic priorities have been outlined for implementation to ensure that pragmatic steps are taken to meet targets set for the Phase 2. These priorities include the following:

- Preliminary activities for preferred site selection (historical and filled data collection for site assessment and evaluation studies);
- Critical actions to earn and sustain social license for the Nuclear Power Project for both Communities of candidate site locations and the general public;
- Establishment of Communication protocols with the Nuclear Regulatory Authority;
- Activities leading to Vendor / Strategic Partner selection for the Nuclear Power Project development.

Overall, we seek to commence about One-hundred and sixty-one (161) tasks of which thirteen (13) deliverables are expected by the end of the year.

These tasks have been grouped according to the IAEA's Nineteen (19) Infrastructure Issues. The deliverables are mainly Policies, Procedures, Plans, and Programmes that will guide the execution of Phase 2 activities and beyond.

The Vendor engagement process to select the strategic Vendor requires a high-level government support, involvement, and engagement. Deciding on the strategic Vendor would strengthen the focus of the Project development activities, especially training and competency development of staff, Siting and related studies, and Grid Integration Study.

We are confident that with the support of Government, the Ministry of Energy and Sponsoring Institutions, guidance from the Board, and commitment from staff we will achieve our identified targets to enable the Sod-Cutting for construction of Ghana's First Nuclear Power Plant.


FORUM
2020


SELF-SUFFICIENCY
NOVEMBER
2020

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