

# OF COMMUNICATIONS eTransform Ghana Project

AN ESMF FOR E-TRANSFORM GHANA PROJECT

DRAFT REPORT

Submitted by:

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**CONTENTS**

LIST OF TABLES..... iv

EXECUTIVE SUMMARY ..... v

CHAPTER ONE ..... 1

1.0 INTRODUCTION ..... 1

1.1 OBJECTIVE OF ESMF..... 2

1.2 METHODOLOGY..... 2

    1.2.1 Data Collection..... 3

    1.2.2 Data Analysis..... 6

CHAPTER TWO ..... 7

2.0 PROJECT DESCRIPTION..... 7

2.1 PROJECT COMPONENTS..... 7

2.2 EXPECTED PROJECT BENEFITS ..... 20

2.3 INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS..... 20

2.4 PROJECT ACTIVITIES WITH ENVIRONMENTAL POTENTIAL ..... 21

CHAPTER THREE ..... 22

3.0 BASELINE INFORMATION ..... 22

3.1 COASTAL BELT ..... 22

    3.1.1 Population Size and Density ..... 22

    3.1.2 Climate ..... 22

    3.1.3 Vegetation ..... 22

    3.1.4 Geology, Soil and Minerals..... 23

    3.1.5 Topography and Drainage ..... 23

    3.1.6 Economic Activities..... 23

3.2 MIDDLE BELT ..... 24

    3.2.1 Population Size and Density ..... 24

    3.2.2 Climate ..... 24

    3.2.3 Vegetation ..... 24

    3.2.4 Geology, Soil and Minerals..... 24

    3.2.5 Topography and Drainage ..... 25

|  |    |
|--|----|
|  | 25 |
|  | 25 |
| 3.3.1 Population Size and Density .....  | 25 |
| 3.3.2 Climate .....  | 25 |
| 3.3.3 Vegetation .....   | 26 |
| 3.3.4. Geology, Soil and Minerals.....   | 26 |
| 3.3.5 Topography and Drainage .....  | 27 |
| 3.3.6 Economic Activities .....  | 27 |
| CHAPTER FOUR .....   | 28 |
| 4.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK.....   | 28 |
| 4.1 ENVIRONMENTAL POLICY FOR GHANA .....   | 28 |
| 4.1.1 Environmental Assessment Regulations 1999, LI 1652, 1999 and (Amendment) LI 1703, 2002 ..... | 28 |
| 4.1.2 Environmental Protection Agency, Act 490, 1994 .....   | 29 |
| 4.1.3 Local Government Development Control Regulations .....                                       | 29 |
| 4.1.4 Occupational Safety and Health Policy of Ghana .....   | 29 |
| 4.1.6 Ghana Atomic Energy Act588 and Radiation Protection Regulations, LI1559 .....                | 30 |
| 4.1.7 National Communication Authority Act: .....  | 30 |
| 4.1.8 Environmental Assessment Regulations and Procedures: .....                                   | 31 |
| 4.2 THE WORLD BANK SAFEGUARDS POLICIES .....   | 32 |
| 4.2.1 Operational Procedures .....   | 34 |
| 4.2.2 Environmental Assessment (EA) Instruments .....  | 34 |
| 4.2.3 Environmental Assessment: Roles of Bank and Borrower .....                                   | 35 |
| 4.2.4 Environmental Screening .....  | 35 |
| CHAPTER FIVE .....   | 38 |
| 5.0 POTENTIAL PROJECT IMPACTS AND MITIGATION MEASURES.....   | 38 |
| 5.1 ENVIRONMENTAL IMPACTS .....  | 38 |
| 5.1.1 Positive Environmental Impacts .....   | 38 |
| 5.2.2 Negative Environmental Impacts.....  | 39 |
| 5.2 SOCIAL IMPACTS.....  | 44 |
| 5.2.1 Positive Social Impacts.....   | 44 |
| 5.2.2 Negative Social Impacts.....   | 45 |



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|  |    |
|--|----|
|  | 46 |
|  | 48 |
| 6.0 IMPLEMENTATION AND MANAGEMENT .....                          | 48 |
| 6.1 ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN.....            | 48 |
| 6.2 KEY INSTITUTIONAL FRAMEWORK .....                            | 49 |
| 6.2.1 Role of the Ministry of Communication (MOC): .....         | 50 |
| 6.2.2 Role of District Assemblies .....                          | 50 |
| 6.2.3 EPA’s Safeguard Representatives:.....                      | 51 |
| 6.2.4 Project Contractors, Consultants and Private Sector: ..... | 51 |
| 6.2.5 Project Oversight: .....                                   | 51 |
| 6.2.6 Capacity Building.....                                     | 52 |
| 6.2.7 Monitoring Program:.....                                   | 53 |
| CHAPTER SEVEN .....  | 54 |
| 7.0 CONCLUSIONS .....  | 54 |



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|  |    |
|--|----|
| Table 1: Components of the e-Transform Ghana Project .....                             | 8  |
| Table 3: Matrix on Negative Environmental Impacts with the Mitigation Factors<br>..... | 40 |
| Table 4: Matrix on Negative Social Impacts and Mitigation .....                        | 46 |
| Table 5: Framework for Implementing Environmental Management Plan.....                 | 49 |



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The electronic transformation intervention is aimed at changing the way government functionaries provide services. It will harness information technologies (such as Wide Area Networks (WAN), the Internet, and mobile computing) to transform service operations for a number of government agencies including the health, educational, judiciary, sectors etc. Its major components include- Component 1: Enabling Environment for Electronic Government; Component 2: Common Services and Infrastructure for Electronic Government; Component 3: Scale up of e-Services and Applications; Component 4: Project Management Support.

The project will involve the development of internet and computer networks and its expansion. It will be implemented nationwide across the three geophysical zones of Ghana namely the Coastal, Middle and Northern belts.

It will be executed within the environmental policy requirements of the Government of Ghana (GoG) and the World Bank safeguard policy regarding the conduct of environmental assessments and the provision of environmental mitigation measures. These include the Environmental Assessment Regulations 1999, LI 1652, 1999 and (Amendment) LI 1703, 2002 and the Environmental Protection Agency, Act 490, 1994 for GoG and the Environmental Assessment (OP 4.01) of the World Bank.

Some potential positive project impacts include; (i) the improvement of intra-organizational and inter-organisational management due to the introduction of electronic network technologies and standards; (ii) introduction of environmentally friendly methods of operation by for example reducing material consumption through the shifting away from books to bytes, compact disks to MP3s, check books to clicks, etc..

These positives notwithstanding, it is anticipated that the implementation and expansion of the e-Transform services in the country will increase energy use

Previously executed manually will be replaced with [redacted] that will introduce pollution from e-waste in terms of its disposal and hazardous substances. However, it can be said that the negative environmental impacts expected from the project within the ESMF are moderate to minimal.

By ensuring that energy efficient resources with minimum negative environmental impact are used, with existing systems and facilities replaced with new energy efficient brands, the negative impact of higher energy consumptions would be mitigated. The extent to which electronic network systems affect the environmental sustainability is dependent on the mitigation measures implemented to check negative environmental impacts. This ESMF has identified the social and environmental impacts (positive and negative) and defined the necessary environmental mitigation measures to ensure that potential negative impacts are adequately and effectively addressed for the implementation of the e-Transform Platform Project.



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## 1.0 INTRODUCTION

Ghana has been a pioneer in African telecommunications sector, leading the region in market liberalization deregulation, and serving as a hub for submarine cables linking the southern and northern Africa to Europe with impressive internet bandwidth and improved communications infrastructure. However, Ghanaians have not yet fully adopted ICT in their daily lives or in business operations. While mobile phone penetration is over 100 percent, the phones are used primarily for voice communications. In spite of the recent significant increase of Internet bandwidth and huge price falling of devices as well as usage charges, Internet users in Ghana are still less than 10 percent of the total population, and mobile broadband usage is extremely low (1.7 percent in 2011).

A recent ICT for Transformation Report prepared under a World Bank Technical Assistance concludes that Ghana has the potential to develop a knowledge-based economy and become a strategic destination for ICT-based business processes in the region. To achieve this, however, the country needs to create a critical mass of users of e-enabled services by promoting: i) local content, services and applications (including for entertainment, agriculture, health, education, banking, electronic identification) that are interesting, relevant and affordable to attract enough users (either individual or corporate) to pay for or use these services; and ii) mobile payment systems that offer micro-transactions to facilitate easy payment for services done at scale, support applications that reach citizens nationwide, improve the efficiency of service delivery while creating jobs and stimulating inclusive growth.

The e-Transform Ghana project will harness information technologies (such as Wide Area Networks (WAN), the Internet, and mobile computing) to transform service operations. The project is a joint collaboration between the Government of Ghana (GOG) under the auspices of the Ministry of

World Bank (WB). The environmental safeguard and the World Bank require that Information technology and communications based projects meet their stipulated environmental safeguard requirements. This report presents the Environmental and Social Management Framework (ESMF) within which the e-Transform Ghana project will be implemented.

## 1.1 OBJECTIVE OF ESMF

The purpose of the ESMF is to establish the potential environmental impacts of the e-Transform project in Ghana. Specifically, it seeks to achieve the following:

- Define the potential environmental and social impacts of the proposed project.
- Establish measures relevant for mitigating the negative social and environmental impacts.
- Develop an environmental mitigation monitoring and management plan to ensure that the proposed mitigation measures are implemented effectively;
- Identify institutional arrangements and responsibilities for implementing and monitoring the ESMF and
- To recommend appropriate interventions required should other environmental impacts emerge at the definition of the detailed project implementation plan and activities.

## 1.2 METHODOLOGY

The approach to the preparation of the ESMF followed the stipulated guidelines of the Environmental Protection Agency (EPA) for such projects. The approach to the study sought to collate information on key environmental issues relating

y interventions required. The steps involved are

**1.2.1 Data Collection:** Information on the environmental issues relating to the project was collated through a literature review of similar projects and other relevant documentations. Consultations were also held with statutory bodies and stakeholders affiliated with the project to gather information. No field studies were conducted because the project is at a preparatory stage and the actual project sites have not yet been identified.

(i) Literature Review: The preparation of the Environmental and Social Management Framework (ESMF) covered a review of relevant literature for the gathering of environmental baseline data. Some of the relevant documents reviewed include:

- Draft Project Appraisal Document of e-Transform Ghana Project.
- Environmental Protection Agency (1996), Environmental Assessment Procedures in Ghana.
- Conventions and Protocols relating to Environmental Protection. Assessment to which Ghana is a signatory.
- World Bank's Operational and Safeguard Policies especially the Environmental Assessment Policy OP 4.01.

On the basis of information obtained from the above activities, potential positive and negative impacts of the project were identified. Existing reports on the project description and other similar projects; reports on the socio physical conditions of Ghana; as well as documentation on best practices in addressing environmental issues relating to electronic network systems were reviewed to provide the background information necessary for impact identification, assessment and mitigation.

(ii) Consultation with statutory bodies and stakeholders: Stakeholders consulted included various persons, entities and organisations involved in the

ion of projects relating to electronic network

- The project planning agency
- Entities already applying electronic network systems
- Identified user agencies of the proposed systems and industry stakeholders.
- Communication and Information Technology Specialists:

To guide the development of the Management and Monitoring framework, discussions were also held with several stakeholders, including representatives of local communities, with regards to the roles they would be playing the management and monitoring of the environmental aspects of the project depending on the particular skills and experience they can offer. Members of civil society are supportive of the project and consider the environmental and social impacts to be minimal to moderate. Table .1 presents the list of stakeholders consulted and Table 2 gives an overview of the issues discussed.

Table 1:List of Stakeholders Consultant

| No | NAME                  | DESIGNATION   | ORGANIZATION                      |
|----|-----------------------|---|-----------------------------------|
| 1  | Nelson Osae           | Project Cordinator  | MOC                               |
| 2  | Victor Adadjie        | M & E Cordinator  | MOC                               |
| 3  | Tony Amedzakey        | Ag IT Director  | Electoral Commission              |
| 4  | Edward Tettey         | Snr Network Technician                                    | Electoral Commission              |
| 5  | Sarah Mensah          | Electoral Officer   | Electoral Commission              |
| 6  | Nicolas Owusu-Appiah  | IT Officer  | Birth and Death Registry          |
| 7  | Emmanuel N. Botchway  | IT Officer  | Birth and Deaths Registry         |
| 8  | John Y. Agbeko        | Registrar   | Birth and Deaths Registry         |
| 9  | Dr. Emmanuel Odame    | Head, Policy Planning Monitoring and Evaluation Division, | Ministry of Health Headquarters   |
| 10 | Mr. Pepera            | Ag. Chief Executive, National Identification Authority    | NIA Headquarters                  |
| 11 | Mr. Korku Nutsuga     | Consultant  | National Identification Authority |
| 12 | Rev. S.M.A Munyihutum | Headmaster  | Presbyterian Sec. Tech, Aburi     |
| 13 | R.D. Kroti            | Headmaster  | Awudome Secondary School, Tsito   |

|    |                        | SIGNATION                | ORGANIZATION                           |
|----|------------------------|--------------------------|--|
|    |                        | President                | WASSPAG (Wireless Applications )       |
| 15 | Ebo Bentil             | Secretary                | WASSPAG                                |
| 16 | Richmond Atta Williams | Program Officer          | Ghana Education Service                |
| 17 | Prof. Jonas Amoapim    | Director, Infrastructure | National Information Technology Agency |
| 18 | Leslie Tamakloe        | IT Consultant            | NHIS Headquarters                      |

**Table 2 Stakeholder discussions, concerns and suggestions**

| No. | Stakeholder consulted | Issues discussed and concerns raised  |
|-----|-----------------------|---|
| 1.  | MOC                   | <p>MOC is the implementing agency of the project. Discussions were first held with the MOC on the project objectives, the scope of the components, what it involves, the strategic plan, costs, location and the coverage of project activities and the role of the various</p> <p>The environmental laws of Ghana in terms of the requirements of the EPA and affiliated agencies such as the NCA , the Ghana atomic Energy etc for such projects. The World Bank’s environmental safeguards issues were also analysed in the light of the project implementation.</p> <p>Each project component was assessed in relation to its specific activities and the potential environmental impacts which should be addressed in the ESMF.</p> <p>A brief guide to the stakeholder consultations with the affiliated agencies were then developed before the meetings were held with them</p>   |
| 2   | NIA                   | <p>The NIA will be involved in the component that will support the development of a consolidated system for national electronic identification. This will involve the issuance of Identification cards to the Ghanaian public. The consultative process with the NIA on the project involved the transformation of paper systems to electronic systems, development of data base, introduction to biometric systems and the capacity needs of staff in implementing the project The major environmental concerns were on the need for the practice of energy conservation methods, recycling of used ICT equipment effective disposal of e-waste etc.</p>   |
| 3   | MOH                   | <p>The ministry of health will be responsible for the implementation of the e transform component on health This involves the digitization of operational systems such as record keeping and, the health insurance systems, development of Integrated eHealth System; establishment of Integrated Medical Call Centers; Equipment supply etc.</p> <p>This will involve the upgrade of existing electrical installations, and introduction of ITC systems and procurement of ICT equipment. The issues discussed were on what the project components are, what it involves, how the project will be implemented and the expected changes and the benefits to be derived and the role of the MOH, the required expertise etc.</p> <p>The major environmental issues discussed at the meeting were on the establishment of the ICT systems, the expected changes in operational systems, maintenance of the systems, increased energy consumption, the training needs of</p> |

|   |                            |  |
|---|----------------------------|--|
|   |                            | <p>who will operate the systems and sustainability Also discussed is MOH in ensuring sound environmental practices in the project such as adoption of energy efficient practices, adjustment to new working methods, etc</p> <p>The MOE officials were given the opportunity to express their concerns on the expected changes and these were addressed accordingly</p>  |
| 4 | MOE                        | <p>This component will finance Wireless Networks for the Selected Secondary Schools and it will include Digital Content for Schools The project activities will include: WAN connectivity for schools; WAN Connectivity for 4 Medical call centres; LAN Installation for school Labs; Bandwidth Costs; Maintenance Costs</p> <p>The major issues discussed were on what the project will entail, , in terms of the content development open education resources establishment. Participants sought clarifications on , how the project will be implemented, the coverage, how schools will be selected and the benefits o be derived</p> <p>Also discussed were the role of the MOE in the project planning, implementation and operation phase. The need to ensure of sound environmental practices and the role of the MOE in ensuring that this is achieved</p> |
| 5 | Births and Deaths Registry | <p>The births and deaths registry has commenced with digitization of their records. So far 6 million has been digitized but are left with 12 million records to digitized due to financial constraints. They expressed the need for the e transform project to assist them digitize the remaining 12 million records to facilitate records retrieval at the consultative sessions.</p> <p>They also expressed the need for systems upgrade to enable their systems to communicate with other data basis such as the national identification authority. It was agreed to assist as requested and discussions were held on modalities for defining and implementing the requested assistance</p>   |

**1.2.2 Data Analysis:** The analysis of the information collated concentrated on the details of the project description, the baseline characteristics of the socio physical environment within which the project is to be implemented and the possible positive and negative social and environmental impacts of the project. These impacts were assessed and evaluated on the level of significance to the legal environmental requirements of GOG and the World Bank and mitigation measures were then proposed to prevent or minimize the adverse impacts in order to enhance the environmental benefits resulting from the project. An environmental management programme and monitoring plan was then developed to ensure that the project is implemented and sustained in a manner as to protect the environs of project location.



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## **2.0 PROJECT DESCRIPTION**

The development objective of the e-Transform Ghana Project is expected to be achieved through interventions which collectively are expected to: improve targeting of government resources, leading to more efficient use of public funds; improve efficiency and coverage of priority government services, particularly in rural and underserved areas; and nurture entrepreneurship and increase jobs through ICT-enabled entrepreneurship. The interventions include unique electronic identification systems, that validate citizens and confirms rights to public services while promoting better access to online transactions, financial and other services; and innovative applications to improve service delivery in the priority areas of health, education, judicial, and parliamentary services.

### **2.1 PROJECT COMPONENTS**

The project is part of Government's efforts to develop more coherent and robust foundation to facilitate access to e-government services. It will involve a scaled use of ICT to transform quality of service in priority areas of development; provide enabling environment conducive to e-government applications and services; and provide project management support.

The proposed project is expected to be structured along four major components to reflect (a) government's efforts to develop more coherent and robust foundation to facilitate access to e-government services (b) scaled use of ICT to transform quality of service in priority areas of development; (c) enabling environment conducive to e-government applications and services; and (d) Project management support. A summary of the costed project components is provided in Table 3 and the details on components are given in following sub section.

|          |  |
|----------|--|
| <b>1</b> | <b>Component 1: Enabling Environment for Electronic Government</b>                       |
| 1.1      | <i>Data Protection and Electronic Transactions</i>                                       |
| 1.2      | <i>Storage for Big Electronic Data</i>   |
| 1.3      | <i>Capacity Building for Certification Authority</i>                                     |
| 1.4      | <i>Support for Open Government Data</i>  |
| 1.5      | <i>Support for Linkage and Identity Verification Services to User Agencies</i>           |
| 1.6      | <i>Support for Improving the Innovation and IT-enabled entrepreneurship Ecosystem</i>    |
|          |  |
| <b>2</b> | <b>Component 2: Common Services and Infrastructure for Electronic Government</b>         |
|          | <i>Electronic Repository of Citizen Identity and Authentication</i>                      |
|          | <i>Digitized Government Data</i>   |
|          |  |
|          |  |
| <b>3</b> | <b>Component 3: Scale up of e-Services and Applications</b>                              |
| 3.1      | <i>e-Services</i>  |
| 3.2      | <i>e-Application</i>   |
| i        | Use of ICT to improve health delivery services in rural and underserved communities (5m) |
| a        | <i>Situational Analysis and Strategic Plan for Integrated eHealth System in Ghana</i>    |
| b        | <i>Integrated Medical Call Centers</i>   |
| c        | <i>Wireless Networks for the Selected District Hospitals</i>                             |
| d        | <i>Electronic Medical Records</i>  |
| ii       | Use of ICT to improve Educational Outcomes (6m)  |
| a        | <i>Wireless Networks for the Selected Secondary Schools</i>                              |
| b        | <i>Digital Content for Schools</i>   |
| c        | <i>Teachers' Network and Educational Portal</i>  |
| d        | <i>Capacity Building for Teachers and School/Institutional Leaders</i>                   |
|          |  |
| iii      | Use of ICT to improve Judicial, Parliamentary and Procurement Services (15)              |
| a        | <i>e-Parliament</i>  |
| b        | <i>e-Justice</i>   |
| c        | <i>e-Procurement</i>   |
|          | <i>e-Immigration</i>   |
|          |  |
| <b>4</b> | <b>Component 4: Project Management Support</b>   |
| 5        | PPA  |
| 6        | Contingency  |
|          | <b>Total</b>   |

### 2.1.1 Component 1 - Enabling Environment for Electronic Government:

This component will support policies, regulations and institutional capacity building to promote electronic delivery of services using shared platforms and transformational applications within a transparent, secure and open environment. It will also provide support for storage of electronic data, and



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ication Authority (CA) as a trusted third party  
ally verifying the legitimacy of the identity of

individuals or organizations prior to issuing digital certificates. Details of sub-components as follows:

**Component 1.1 Data Protection and Electronic Transactions:** It will involve storage, protection and opening of government data. Project resources will support initiatives including (i) preparation of additional datasets for open data; (ii) upgrade of shared facilities such as portal and related applications; (iii) institutional capacity building, and iv) policies and regulations for open data and innovative analytics methods (such as big data analytics) and engagements with the private sector, civil society and academia.

Funds from the project will support a) development of administrative arrangements for data protection and electronic transactions under the respective Acts, b) development of guidelines to implement, monitor compliance and investigate/resolve complaints, c), keeping and maintaining the Data Protection Register, d) development of guidelines on how information is obtained, held, used or disclosed, and e) institutional capacity building for the Data Protection and Electronic Transaction Commissions.

The major activities include the following:

- Hardware and software for cloud storage system
- Upgrade of portals for open Government Data
- Content development for open data initiative
- Technical Assistance (TA) for Development of Policies and Regulations for open data
- Capacity building for Data Analytics
- Development and Installation of integrated Data protection system
- Equipment for data Protection Commission
- Operational costs for Data Commission
- TA to develop Guidelines for certification Authorities.

the installation of physical aspects of computers, telephone lines, cable television lines, routers etc.

Others are programmes, servers and operating systems which will be used to operate the computers and the related devices. Most of these will be done on existing systems so the potential environmental impact of this component will be minimal. The major issues of environmental concerns include increased use of ICT systems and the related increase in energy consumption and the need for effective disposal systems.

**Component 1.2 Storage for Big Electronic Data:** The component involves support for digital platforms and Innovation Centres for Entrepreneurship and Job creation. Project Funds will provide capacity building support for an innovation hub (including iHub and Living Lab), in collaboration with infoDev and private sector. The Innovation Hub will be central to development/adaptation of innovative applications for the e-health and e-education sub-components under the project. Additionally, for longer term capacity building, the project expects to collaborate with private sector and reputable public training and academic institutions such as Kofi Annan Center of Excellence, GIMPA, or the Kwame Nkrumah University of Science and Technology or some similar institutions on an IdeaFAB for identifying and researching future opportunities in emerging technologies and innovation which leverage digital platforms.

Project funds will support: a) the definition of protocols, capacity, performance, scalability, manageability and cost of a private cloud, and b) the software and hardware for the development of a private cloud storage service which is more suitable for actively used data and allows organizations such as National Identification Authority (NIA), Births and Deaths and other MDAs to have more security and control over data. Storage will be on a dedicated infrastructure within the Government's data center, which will ensure security and performance. This component will also provide the platform for integrating

ions such as the National Health Insurance  
Health Service (GHS), Births and Deaths Registry,  
National Immigration Service etc.

The specific activities will include:

- TA for establishment of iHubs and mLabs
- Establishment of iHubs and mLabs
- Operational costs for iHubs and mLabs
- Capacity building for iHubs and mLabs

Project Funds will support limited equipment, upgrade of databases, and capacity building for key user agencies to adjust their business processes and supporting software systems to utilize e-ID verification services from the NIA system. Project funds will also support linkage of key agencies including the Births and Deaths Registries, Department of Social Welfare, Electoral Commission, Statistics Department, Social Security and National Insurance, and Immigration using the National Identification number as a common identifier.

The component will be linked to the Information Technology Enabled Services (ITES) and the Business Process Outsourcing (BPO) Centre which is to be established under the on-going e Ghana project so it is not anticipated to have any significant environmental impacts. The related abbreviated resettlement action plan (arap) for the refurbishment of the proposed location for the BPO centre at Accra is being prepared under the mentioned project so will not affect the environmental considerations for this project. The major issues of environmental concerns include increased use of ICT systems and the related increase in energy consumption and the need for effective disposal systems.

**Component 1.3 Capacity Building for Certification Authority:** This will mainly involve institutional capacity building for policy and regulatory institutions. Project funds will support software, hardware for the development of an

including Public Key Infrastructure (PKI) which for electronic transaction to identify one another by providing authentication of digital certificates. The process is expected to foster more reliable business communications by providing confidentiality through the use of encryption, and authentication of data integrity. Project funds will also support institutional capacity building for the Certification Authority.

The project activities will include

- TA to advise NCA for Policy Review
- TA for review of Spectrum management Plan
- TA for development of new ICT4D pillars
- TA for policy development for Data Protection Commission
- Staff capacity development for regulatory institutions

There are no environmental consequences for this sub component since most of the activities are in the form of technical assistance.

**2.1.2 Component 2: Common services and Infrastructure for Electronic Government** - This component will provide support for shared systems, processes and information for use across government, and facilitate a trusted exchange for government-to-citizen (G2C) services and business-to-citizen (B2C) services. Specific activities will include:

**Component 2.1 Electronic Repository of Citizen Identity and Authentication:** The sub component mainly involves TA services to update and implement national electronic Identity (ID) Cards System. The component will support the development of a consolidated system for national electronic identification. Project funds will support: i) the distribution of existing biometric cards and completion/distribution of remaining cards, ii) upgrade of the National ID cards into smart cards for use in multi-purpose and electronic

onal strengthening and capacity building for  
maintaining a state-of-the-art e-ID system. The

major activities are:

- Distribution of printed Cards
- Mobile Registration/Verification Workstations

The potential environmental concern on this sub component is increased use of paper.

**Component 2.2 Support to Upgrade of Current Biometric systems to Smart Cards:** The component will support the upgrade of current biometric systems to smart cards.

The project activities are:

- Procurement of tools and spares for printer
- Portal SMS development
- Printer Upgrade
- Printers for Instant Issuance
- Automated Fingerprint Identification System (AFIS)
- Datacentre Upgrade
- Blank cards
- Upgrade of central printing equipment
- Dynamic Range Compression (DRC)
- TA to support NIA in Requirement Specifications

The Datacentre to be used is already in existence so there will not be need to provide a physical structure for the purpose. The potential environmental issues associated with this component are excessive use of printer cartridges and paper.

**Government Data:** The project will support Digital Identity and Verification Systems into User Agency Operations. Project funds will support scanning, indexing and management of paper records into searchable and re-usable electronic databases. The digitization program is expected to be extended to medical and educational records based on need. The work will build on earlier support from the Rockefeller Foundation which trained and employed disadvantaged youth to digitize the first batch of Registrar General's Department (RGD) records through an Impact Sourcing Program. The project activities

- TA for Development of policy and standards to support Digital Identity and verification systems
- Hardware and software upgrade
- Operational support costs for User Agencies
- TA for defining requirements for Digitization
- Digitization of public and medical records
- Upgrade of Equipment for selected Agencies

These activities will involve the installation and upgrade of ICT equipment and network systems. The potential environmental concerns include increased use of ICT systems and the related increase in energy consumption and the need for effective disposal systems.

**Component 2.4 Institutional Capacity Building NIA:** This will include capacity building for NIA and Operational support.

**2.1.3 Component 3 - Scale up of e-Services and Applications:** The project will support the development of online and mobile applications at scale for selected government services so that citizens nationwide can apply for services online or via mobile phones, check status of their accounts or applications, and pay for services electronically. The project will also support applications and

improve the efficiency and outreach of service (Health and Education) and government agencies (Judicial Services, National Procurement Agency and Parliament). State of the art technology relevant to Ghana will be used to simplify administrative and business processes within and between agencies.

(i) **e-Services:** The project will build on pilot e-service applications conducted under current eGhana project which included: (i) content management application for hosted services on online portals; (ii) payment gateway to enable electronic payments for online services; (iii) electronic form application to collect citizen information; and (iv) applications to electronically manage documents. Project Funds will support expanded services from these institutions such as online applications for permits and licenses, visas, and National ID Cards (both internally and externally).

(ii) **e-Applications:** The component will focus on using ICT applications to improve the outcomes of the priority sectors of Health and Education. It will also allocate funds to complete e-government applications for 3 agencies and departments for which the procurement packages have been completed under the eGhana Project even though funds have been exhausted under the project. Details of this sub-component are as follows:

**Component 3.1 Integrated eHealth Systems in Ghana:** It is on the use of ICT to improve health delivery services in rural and underserved communities: This sub-component will finance: (i) Situational Analysis and Strategic Plan for Integrated eHealth System in Ghana; (ii) Integrated Medical Call Centers; (iii) Wireless Networks for the Selected District Hospitals and (iv) Electronic Medical Records. The project activities include:

- Situational Analysis and Strategic Plan for Integrated eHealth System in Ghana
- Equipment and medical call centers
- Operational support costs for medical call centres.

issues associated with this component are of ICT related equipment and network systems.

Physical space for the medical call centres will be provided by the beneficiary health institutions and no new construction or civil works is envisaged for funding under this project.

**Component 3.2 Schools:** This component will finance Wireless Networks for the Selected Secondary Schools and it will include Digital Content for Schools. The project will leverage the National IT Agency (NITA) Network to reduce the cost of extending connectivity to the selected secondary and technical schools especially those in rural areas and which have greater need to improve quality of teaching and learning. Selected schools will be eligible for WIMAX/LTE installation to school site, devices, and up to 3Mbps of dedicated capacity for the project duration of 5 years. The project activities will include:

- WAN connectivity for schools
- WAN Connectivity for 4 Medical call centres
- LAN Installation for school Labs
- Bandwidth Costs
- Maintenance Costs

The WAN connectivity to selected school sites and medical centres involves connecting customer premises to NITA's Network. The process for last mile connectivity solution involves erecting a small pole about 75mm in diameter with a height of about 3-5m at the highest point of site location. A Customer Premises Equipment (CPE) is mounted on the pole for a Line of Sight (LOS) connectivity to NITA's network. A switch is attached to the CPE which is configured to interface to NITA's Data centre via the network.

The major environmental concern of the sub component is the erection of Masts. However these are 3.5 in height and will be mainly erected on existing buildings with minimum environmental impact.

**Improve Educational outcomes:** In collaboration e.g. Ghana Associations of Mathematics and Science Teachers (GAMT and GAST), as well as the wider content development community, and using open education resources, the project will support the development of state of the art educational content, particularly in mathematics, technology including ICT and science in formats that promote effective teaching and encourages learning. To ensure more sustainable approach to content access, the project will also provide resources to the relevant associations to collaborate with the private sector to develop paperless textbooks, reading and other learning materials.

This component will finance (i) Teachers' Network and Educational Portal; (ii) Capacity Building for Teachers and School/Institution Leaders. The project activities will include:

- Development of Teachers educational portals
- Hardware and software portals
- Capacity Building for Teachers and School/Institutional Leaders
- Development of Digital Content for schools

The potential environmental issues associated with this component are essentially on the increased use of ICT related equipment and network systems.

**Component 3.4 Additional e government applications:** This component will involve the extension of e government services to additional government institutions in Ghana including the Parliament, Judiciary, Procurement and Immigration services. This subcomponent will provide funds to complete e-government applications for 3 agencies and departments for which the procurement packages have been completed under the eGhana Project, albeit without the requisite funding.

(i) **e-Parliament:** The Ghana Legislative Assembly will soon implement the 'e-Parliamentary System', marking a high-tech shift in the way business is

ouse. “Under the e-Parliamentary System, the  
eir queries to the government ‘online’, leading

to speedy and paperless flow of information. Project funds will support hardware, software and institutional capacity building for the implementation of the eParliament system.

(ii) **e-Justice:** The Ministry of Communications has initiated a process to assist the Judicial Service in developing an e-Justice System to improve on the effectiveness and efficiency of justice delivery in Ghana. Project funds will support the roll out of a core Court Management System and Recording/Transcription systems and institutional capacity building for the implementation of the CMS.

(iii) **e-Procurement:** The objective is to develop a plan for the phased development of an e-procurement strategy and design that will enable the PPA to provide a single platform for “e-Sourcing”, “e-Tendering”, and “e-Purchasing”. Project funds will support hardware, software and institutional capacity building for the implementation of the e-Procurement solution.

(iv) **e-Immigration:** This sub component will extend e government services to the Ghana Immigration to facilitate their operations. It will involve the expansion and upgrading of ICT installations in the agency. The potential environmental impacts will be limited since space will be provided within the vicinities of the selected immigration offices for the ICT installations.

**Component 3.5 e-Services:** The project will build on pilot e-service applications conducted under current eGhana project which included: (i) content management application for hosted services on online portals; (ii) payment gateway to enable electronic payments for online services; (iii) electronic form application to collect citizen information; and (iv) applications to electronically manage documents. Project Funds will support expanded services from these institutions such as online applications for permits and



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D Cards (both internally and externally). The

- Upgrade of Hardware and software
- Eservices portal upgrade
- Capacity Building for User agencies
- Operational Support Costs for User Agencies.

This sub component involves the provision of electronic services on line with minimal environmental consequence.

#### **2.1.4 Component 4 - Project Management and Impact Evaluation Support:**

The MoC will serve as the project executing agency and, given the multi-sectoral nature of the project, will work with relevant sector agencies for the effective implementation of the project will have overall responsibility for the management of the project. The MoC has had extensive experience in implementing the eGhana through a dedicated Project Implementation Unit, complemented by core group of consultants from the National IT Agency (NITA) and the ITeS Secretariat who have managed the day-to-day implementation and supervision of the e-Government and ITES components as well the financial management, procurement, disbursement, monitoring and evaluation, progress reporting and communication functions.

Project funds will support the existing team for the overall project coordination and management, and will provide communication, procurement, financial management, and M& E. Additional resources will be provided to strengthen capacity as needed, following the assessment. Also in view of the innovative and transformative nature of the project, funds will be allocated to documenting successes and failures, as well as the impact of the project on project beneficiaries. The major cost centres of this component will be

- Staff Costs
- Operational Costs



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- M and E collection

## 2.2 EXPECTED PROJECT BENEFITS

The electronic transformation intervention under the project will change the way government functionary provide services. Traditional intermediary functions will be replaced with modern ICT technology. New products will be developed and far closer relationships will be created between government agencies. The mode of service delivery by each organisation will change through new channels of knowledge diffusion. Service interactivity will be established through more flexibility and adaptability. Workers' functions and skills will be also be redefined.

## 2.3 INSTITUTIONAL AND IMPLEMENTATION ARRANGEMENTS

The project will be implemented under the aegis of the (MOC), serving as the Project Executing Agency. For the day to day implementation of the project the MOC will be supported by the expert team established under the on-going eGhana project such as NITA and the ITES team. The ITES team has a solid experience in implementing supervising eGhana's eGovernment and ITES components. Its procurement and financial management, and monitoring and evaluation capacity are considered satisfactory to IDA, and its performance under the eGhana project is so far considered satisfactory.

For the technical and multi-sectoral requirements of the "e-Transform" project, the MOC will work with the relevant sectors/units including the education and health ministries and will leverage the expertise of highly specialized experts for effective implementation. However, considering the complementarities of both ICT operations, implementing both projects under one project unit will facilitate coordination and free up resources.

unit (PIU) will be assisted by a project team, and technical experts from other ministries/sectors - as focal points - for the non-project management components. Implementation oversight will be provided by a Project Implementation Team which will be chaired by the MOC and will have the membership of relevant sector and agency units to ensure successful sub-component implementation. The various sector and agency units may be held accountable for agreed results and for timely implementation.

## 2.4 PROJECT ACTIVITIES WITH ENVIRONMENTAL POTENTIAL

The project will involve the development of internet and computer networks and its expansion. The connectivity infrastructure will be in the form of wireless networks which utilize radio waves and or microwaves to maintain communication channels between computers. This relies on copper and or fiber optic cabling between network devices with potential electromagnetic wave discharge.

In implementing the project, new products and services through internet or mobile phones will be introduced and existing facilities will also be upgraded. The likely environmental impacts from the project are expected to be minimal because most project activities will be carried out in already existing buildings/infrastructures.

The socio-physical environment within which the project will be implemented; and the environmental policy framework which will guide the mitigation of the environmental concerns of the project are submitted in the next sections of this report.

### 3.0 BASELINE INFORMATION

The project will be implemented nationwide. Thus the geophysical zones within which the project will spread is categorised into the Coastal belt; Middle belt and Northern Belt. The detail characteristic of each zone is presented as follows:

#### 3.1 COASTAL BELT

**3.1.1 Population Size and Density:** The population of Ghana is mostly concentrated in the coastal region. With a population of 10,706,190, the regions along the coast have close to half of the country's population (43.4%), (Population and Housing Census of Ghana, 2010). This could be largely ascribed to the enormous economic opportunities which abound within the coastal regions. Masses therefore drift from the North to these regions in search of these economic opportunities. The coastal region is the most densely populated – 415.5 persons occupy a square km (Population and Housing Census, 2010). It should be noted that this is largely driven by the Greater Accra region whose population density is 1,236 persons per square km.

**3.1.2 Climate:** Much of the coastal region is relatively dry since it falls within the dry equatorial zone and moist semi-equatorial zone. Temperatures vary between 20° and 30° Celsius whilst the annual rainfall is 635 mm - 1,140 mm. There are two rainfall peaks often in June and October.

**3.1.3 Vegetation:** The vegetation along the coast has grassland and few trees while semi-deciduous forest dominates the inland areas. It is worth noting that a greater part of the original dense forest vegetation has been cleared for the cultivation of crops. Mangroves, comprising two dominant species, are found in the tidal zone of all estuaries sand lagoons. Salt tolerant grass species cover substantial low-lying areas surrounding the lagoons.

squirrels, monkeys and reptiles live in Accra. have grass cutter, bush baby and BossmanPotto

are found in the Achimota forest and outside the urbanised area. The Akuapim Hills also provide sheltered habitats for many bird and animal species. The open lagoon systems support a wide range of crustacean, mollusks, gastropods, predatory and bottom feeding fish. The lagoons are important breeding grounds giving adequate protection.

**3.1.4 Geology, Soil and Minerals:** The coastal region is mainly underlain by shallow rocky soils and is extensively developed on the steep slopes of the Akwapim range, Weija hills and basic gneiss inselbergs. On the Akwapim range, the soils are mainly pale and sandy with brushy quartzite occurring to the surface in most places. These soils are rich in sandstone and limestone that are good source of material for the construction industry. These soils also have low organic contents with which limit the capacity for crop production. Some parts of the coastal region such as the Central and Western regions are endowed with rich natural resources like gold, bauxite, petroleum, natural gas and diamond.

**3.1.5 Topography and Drainage:** The main rivers that flow through the coastal regions include the Volta and Densu. In addition, there are small seasonal streams flowing mostly from the Akwapim Ridge into the sea through numerous lagoons. Because the region is bordered on the south by the Gulf of Guinea, there are ecologically very important but highly polluted lagoons and wetlands in particularly in some parts of the Greater Accra region.

**3.1.6 Economic Activities:** There is a wide discrepancy in the sector of work among regions along the coast regions. At this part of the country, the Greater Accra region has the least proportion employed in agriculture and related work – 7.5% (Population and Housing Census, 2000). In this region, an overwhelming majority are engaged in the service and manufacturing sectors. On the contrary, the Western Region is largely agrarian as 61.2 percent of its population is engaged in agriculture (Population and Housing Census, 2010).

**3.2.1 Population Size and Density:** The middle belt is second to the coastal region in terms of population size. This area has a population of 9,724,472, representing 39.4% of the country's population (Population and Housing Census, 2010). It serves as a transit point for migrants from the Northern part of the country heading towards the South. It is also second to the coastal region in terms of population density – 130 persons per square km (Population and Housing Census, 2010).

**3.2.2 Climate:** The middle belt mainly lies within the semi-equatorial belt characterised by double rainfall maxima occurring in July and November. The first rainy season is from May to July and the second is from September to November. The dry harmattan season occurs between December and April and is associated with drought conditions. Some streams dry up during this period. Temperature ranges between 20°C in August and 32°C in March. The mean annual rainfall is around 1200mm which is ideal for minor season cropping. Relative humidity is generally high throughout the year, ranging between 70% - 80% in the dry season and 75% - 80% in the wet season.

**3.2.3 Vegetation:** Generally, the regions at the middle part of the country fall within the moist semi-deciduous forest. Most of the trees shed their leaves during the dry season, but not at the same time for all the trees of the same species. The forest contains a large share of the country's valuable timber trees such as Wawa, Onyina, Mahogany, Asanfena, Sapele and Dahoma. However, a confluence of illegal activities, bushfires and intensive farming practices in the area's forest has resulted in the degradation of pristine vegetation into secondary forest.

**3.2.4 Geology, Soil and Minerals:** The major geographical features in the middle belt include the Kwahu scarp with an elevation of 2,586 feet above sea level; the Atiwa-Atwaredu ranges reaching an elevation of 2,400 feet; the

elevation of 1,530 feet which is the southern kora mountain ranges and the isolated hills/mountains dotting the relatively low-lying plains to the south. The area is rich in minerals such as gold, diamond, bauxite-tantalite, limestone, kaolin and clay.

**3.2.5 Topography and Drainage:** The topography in the middle belt is generally undulating. The pattern of flow is largely dendritic flowing from north to south. Most of the rivers are seasonal and overflow their banks during the rainy season. The major rivers in the area include the Pra, Birim, Densu and Offin. The Volta Lake also covers part of the region. In addition, Lake Bosomtwe, the largest natural lake in the country is in this region.

**3.2.6 Economic Activities:** The 2010 Population and Housing Census shows that within the middle belt, the Ashanti region has the least in agriculture and related work (44.5%) whilst the Brong Ahafo region has the highest (68.6%). On the flip side, the Brong Ahafo region has the least of its population engaged in service and manufacturing (31.4%) whilst the Ashanti region has the highest (55.5%).

### 3.3 NORTHERN BELT

**3.3.1 Population Size and Density:** With a population of 4,228,116, the upper region has the least share of the national population (17.1%), (Population and Housing Census of Ghana, 2010). It is also the most sparsely populated area in the country since its small population is spread over a very large land mass. Its population density is 60.7 persons per square km (Population and Housing Census, 2010).

**3.3.2 Climate:** The upper part is very dry, with a single rainy season that begins in May and ends in October. The recorded volume of rainfall in a year

50 mm. The dry season begins in November and maximum temperatures occurring towards the end of the dry season (March-April) and minimum temperatures in December and January. The harmattan winds, which occur during the months of December to early February, have considerable effect on the temperatures in the region, which may vary between 14°C at night and 40°C during the day. Humidity, however, which is very low, mitigates the effect of the daytime heat.

**3.3.3 Vegetation:** The natural vegetation in the upper part of the country is the savannah woodland characterised by short scattered drought-resistant trees and grass that get burnt by bushfire or scorched by the sun during the long dry season. Again, human activities in the area have adversely impacted on the ecology, resulting in near semi-arid conditions. The common cash crops in the area include common economic trees are the sheanut, dawadawa, boabab and acacia. Some of the characteristic species of trees in this zone are the Baobab, Shea. The Characteristic grasses include members of the genera *Andropogon*, *Hyparrhenia*, *Bothriochloa*, *Loudetia*, *Vetiveria*, *Panicum*, and *Paspalum*. The ecological survey of the right-of-way of the road revealed that the vegetation is typical Guinea Savanna that has seen intensive human intervention, viz. farming and bush burning. The common animals of the project area observed during the survey are *Cattle egret*, *West African Ground Squirrel*, *Rainbow Lizard*, *puff adder*, *spitting cobra* etc.

**3.3.4. Geology, Soil and Minerals:** The upper region's soil is "upland soil" mainly developed from granite rocks. It is shallow and low in soil fertility, weak with low organic matter content, and predominantly coarse textured. Erosion is a problem. Valley areas have soils ranging from sandy candy loams to salty clays. They have higher natural fertility but are more difficult to till and are prone to seasonal waterlogging and floods.

**Topography:** Mostly, the land in the upper regions is low in the northern corner with the Gambaga escarpment and along the western corridor. The region is drained by the Black and white Volta and their tributaries, rivers Nasia, Daka, etc.

**3.3.6 Economic Activities:** Among the three broad categories, the three regions at the Northern part of Ghana have the highest share of their population working in agriculture and related work (67.2% - 73.7). Generally, earnings from agriculture in Ghana are very low, justifying the migration from the Northern part of the country to the middle and coastal areas.

## 4.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

The study has been undertaken in accordance with the environmental policies of Ghana and the World Bank's safeguards policies. In case of conflict in the application of the national laws and the World Bank's policies, the World Bank's policies will supersede the Ghanaian Laws. The details are presented in the following sub sections.

### 4.1 ENVIRONMENTAL POLICY FOR GHANA

Under Ghana's environmental laws, projects involving the use of telecommunication methods and Information and Communication Technology (ICT) facilities have environmental implications and therefore are subject to Environmental Assessment. Since this project is one of such undertakings, consideration for environmental issues is mandatory. This is in accordance with the Environmental Protection Law Act 490 of 1994 under the Environmental Regulation (Legislative Instrument, LI. 1652 of 1999). This report is therefore presented in accordance with the provisions of legal /regulatory and administrative requirements for telecommunications namely the Environmental Assessment Regulations 1999, LI 1652, Local Government Development Control Regulations, Ghana Atomic Energy Act 588 and Radiation Protection Instrument LI1559 National Communication Regulations LI1719 and Ghana Civil Aviation requirements.

**4.1.1 Environmental Assessment Regulations 1999, LI 1652, 1999 and (Amendment) LI 1703, 2002:** These regulations specify the process of registration of undertakings and requirements a proponent has to satisfy to obtain a permit to operate. It is used to provide guidance and ensure adequate

d related sensitive resources for Environmental

**4.1.2 Environmental Protection Agency, Act 490, 1994:** Responsible for advising government on all matters relating to the environment - monitoring sound ecological balance and coordinating environment activities, education and research. The Act also specifies requirements for the production of an EIA for various proposed works.

**4.1.3 Local Government Development Control Regulations:** Any development with spatial orientation at the local Government level has to satisfy development control regulations contained in the following:

- (i). Local Government Act 1993, Act 462: District Assemblies will therefore be responsible for the development, improvement and maintenance of human settlements and environment in the district and local levels.
- (ii). Criminal Code (Act 29) Section 296-297, 1960 - Prevents the accumulation and exposure of filth and refuse of all kinds and the prohibition of activities, which may endanger public health or cause damage to lands, crops, cattle or goods. Any project activities that will pose danger to health and safety will be infringing on this law.

**4.1.4 Occupational Safety and Health Policy of Ghana:** The policy statement of the OSH Policy (draft 2004) is: 'to prevent accidents and injuries arising out of or linked with or occurring in the course of work, by minimizing, as far as reasonably practicable, the cause of the hazards in the working environment and, therefore, the risk to which employees and the public may be exposed'. The policy is derived from provisions of the International Labor Organization (ILO) Conventions 155 and 161. The policy document has specific sections on objectives, scope, strategies, activities and promotion and awareness creation.

of the Labour Act, 2003 (Act 651) is to amend relating to labour, employers, trade unions and industrial relations. The Act provides for the rights and duties of employers and workers; legal or illegal strike; guarantees trade unions and freedom of associations, and establishes the Labour Commission to mediate and act in respect of all labour issues. Under Part XV (Occupational Health, Safety and Environment), the Act explicitly indicates that it is the duty of an employer to ensure that every worker works under satisfactory, safe and healthy conditions.

#### **4.1.6 Ghana Atomic Energy Act 588 and Radiation Protection Regulations, LI1559:**

As per Ghana Atomic Energy Act 588 and the Radiation Protection Instrument LI 1559; the Radiation Protection Institute (RPI) is mandated to ensure that the public, workers and the environment are protected from the harmful effect of radiation. The Radiation Protection Board has put in place a guidance levels as far as radiation from the EMW antennas are concern. These guidance levels are specified in terms of the field intensities and specific absorption rate in relation to the frequency. The Radiation Protection Institute has put in place a system of notification by which owners of all radiation emitting devices including electromagnetic radiation are required to comply with Radiation Protection regulations and addition to any other regulatory requirements in a Ghana.

#### **4.1.7 National Communication Authority Act:**

The National Communications Authority Act, 1996 Act 524 and the NCA Regulations 2003, LI 1719 and the Ghana Telecom Policy have well defined procedures covering the installation of antenna and its support devices. These include the following:

- Licensing of Equipment using Radio Frequency
- Application for construction of aerial mast or tower
- Markings

- Inspection of Mast or Tower lights

#### 4.1.8 Environmental Assessment Regulations and Procedures:

The Environmental Assessment (EA) Regulations combine both an environmental assessment and environmental management systems. The regulations prohibit commencing an “undertaking” without prior registration and environmental permit. Undertakings/activities are grouped into schedules to enable registration and securing environmental permit from the EPA through the EA system. The schedules include undertakings requiring registration and Environmental Permit (Schedule 1), EIA mandatory undertakings (Schedule 2), as well as Schedule 5-relevant undertakings (located in Environmentally Sensitive Areas) in Ghana. The EA Regulations define the relevant stages in the procedure, including:

- Registration;
- Screening;
- Preliminary Environmental Assessment (PEA);
- Scoping and terms of reference (TOR);
- Environmental Impact Assessment (EIA);
- Public Notices and Public Hearing;
- Review of EA reports;
- Environmental permitting and certification; and also
- Environmental Management Plan (EMP); and
- Annual Environmental Report (AER).

The environmental management system refers to the implementation phase environmental stewardship requirements for projects, etc. These include EMP, AER and Environmental Certification. The regulatory Agency conducts compliance monitoring to verify compliance with given approval/permit conditions or against required environmental standard and/or project

also require an environmental audit for a project.

Systematic environmental evaluation process that presents a comprehensive environmental status of an existing project or activity (including risks and liabilities).

An Annual Environmental Report is required to be submitted to the EPA on and for all undertakings granted Environmental Permit 12 months from commencement of operation, and annually thereafter. An annual report would provide an evidence of the extent of compliance with relevant mitigation commitments, monitoring requirements and results, etc. An Environmental Management Plan on the other hand, provides information on the system for meeting the environmental stewardship commitments (including mitigation and monitoring, training, reporting and resource allocation and responsibilities) for a project. EMPs are for projects qualified under PEA and EIA, and required to be submitted to EPA within 18 months of commencement of operations, and updated every 3 years thereafter.

## 4.2 THE WORLD BANK SAFEGUARDS POLICIES

The World Bank's Operational Policies (OP) includes guidance on Environmental Assessment requirements. The Bank's Safeguard Policies, (10 no. of them), are meant to ensure that operations funded by the Bank do not lead to adverse impacts or cause any harm. The World Bank's Safeguard Policies are lumped into Environment, Rural Development, Social Development and International Law. The following are the ten safeguard policies and the details are provided in Table 4.

1. Environmental Assessment (EA)
2. Natural Habitats
3. Forestry
4. Pest Management

7. Involuntary Resettlement
8. Safety of Dams
9. Projects involving International Waters
10. Projects in Disputed Areas

Table 4: World Bank Environmental and Social Safeguards and Their Policy Objectives

| OP/BP | Safeguard                           | Policy Objectives  |
|-------|-------------------------------------|--|
| 4.01  | Environmental Assessment*           | Help ensure the environmental and social soundness and sustainability of investment projects.<br>Support integration of environmental and social aspects of projects in the decision-making process.   |
| 4.04  | Natural Habitats*                   | Promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.   |
| 4.09  | Pest Management                     | Minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, and environmentally sound pest management.   |
| 4.11  | Physical Cultural Resources (PCR)*  | Assist in preserving PCR and in avoiding their destruction or damage. PCR includes resources of archeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.   |
| 4.12  | Involuntary Resettlement*           | Avoid or minimize involuntary resettlement and, where this is not feasible, assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. |
| 4.20  | Indigenous Peoples*                 | Design and implement projects in a way that fosters full respect for indigenous peoples' dignity, human rights, and cultural uniqueness and so that they (1) receive culturally compatible social and economic benefits, and (2) do not suffer adverse effects during the development process.                                     |
| 4.36  | Forests*                            | Realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.  |
| 4.37  | Safety of Dams                      | Ensure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam.  |
| 7.50  | Projects on International Waterways | Ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity and that riparians are notified of the proposed project and its details.   |
| 7.60  | Projects in Disputed Areas          | Ensure that other claimants to the disputed area have no objection to the project, or that the special circumstances of the case warrant the Bank's support of the project notwithstanding any objection or lack of approval by the other claimants.   |

s: The World Bank requires environmental proposals proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. EA is a process which depends on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence. It examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts. It includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favours preventive measures over mitigatory or compensatory measures, whenever feasible.

EA takes into account the natural environment (air, water, and land); human health and safety; social aspects and transboundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The Bank does not finance project activities that would contravene such country obligations, as identified during the EA. EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

**4.2.2 Environmental Assessment (EA) Instruments:** Depending on the project, a range of instruments can be used to satisfy the Bank's EA requirement: environmental impact assessment (EIA), regional or sectoral EA, environmental audit, hazard or risk assessment, and environmental

applies one or more of these instruments, or appropriate. This project applies the ESMF as the appropriate instrument since the exact location of project activities that may have some potential environmental and social impacts are not known at time of project preparation. Additional actions will be taken when the specific sites have been identified and agreed on by the Government of Ghana and the Ministry of Communication.

**4.2.3 Environmental Assessment: Roles of Bank and Borrower:** The Bank screens and sets EA Category, advises borrower on the Bank's EA requirements, reviews and determines if EA provides adequate basis for processing project for Bank financing and makes report available in Infoshop. The Borrower is responsible for carrying out EA, consulting project-affected groups and local NGOs, and providing information in timely manner prior to consultation in a form and language understandable and accessible to groups being consulted.

**4.2.4 Environmental Screening:** The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

**Category A:** A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works. EA for a Category A project examines the project's potential negative and positive environmental impacts, compares them with those of feasible alternatives (including the "without project" situation), and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. For a Category A project, the borrower is responsible for

an EIA (or a suitably comprehensive regional or  
necessary, elements of the other instruments.

The borrower retains independent EA experts not affiliated with the project to carry out the EA. For Category A projects that are highly risky or contentious or that involve serious and multidimensional environmental concerns, the borrower should normally also engage an advisory panel of independent, internationally recognized environmental specialists to advise on all aspects of the project relevant to the EA. The role of the advisory panel depends on the degree to which project preparation has progressed, and on the extent and quality of any EA work completed, at the time the Bank begins to consider the project.

**Category B:** A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas—including wetlands, forests, grasslands, and other natural habitats—are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The scope of EA for a Category B project may vary from project to project, but it is narrower than that of Category A EA. Like Category A EA, it examines the project's potential negative and positive environmental impacts and recommends any measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document)

**Category C:** A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

**Policy Applicable to e-Transform Project:** The  
standard policy of the World Bank applicable to these

potential environmental issues is the:

- i. Environmental Assessment (OP 4.01): The OP 4.01 requires among others that screening for potential impacts is carried out early, in order to determine the level of EA and propose measures to mitigate potential adverse impacts. The OP 4.01 is applicable to all components.

The negative environmental impacts expected from this project within the ESMF are moderate to minimal. The backhaul/backbone from project sites currently not selected the only aspects likely to be addressed in the mitigation factors but it is anticipated for the potential environmental impacts to be within Category C.

## 5.0 POTENTIAL PROJECT IMPACTS AND MITIGATION MEASURES

The e-Transform will support the development of online and mobile applications at scale for selected government services so that citizens nationwide can apply for services online or via mobile phones. The expected increased use of information technology and network systems under the project has a number of social and environmental potential. These potentials include both positive and negative social and environmental impacts.

### 5.1 ENVIRONMENTAL IMPACTS

**5.1.1 Positive Environmental Impacts:** The potentials of positive environmental impacts which can be summarized as follows:

1. The introduction of electronic network technologies and standards will lead to an improvement of intra-organizational and inter-organisational management.
2. The introduction of electronic technology will simplify work methods as well as streamline and optimize work processes within the agencies.
3. The e-Transform will introduce environmental friendly methods of operations such as reduction of the material consumption by shifting books to bytes, compact disks to MP3s, check books to clicks and so on and the reduction of emissions by reducing the transportation
4. Integration of environmental enhancements in the design of the Project can also result in environmental benefits in other sectors. Potential enhancements may include:
  - Use of energy efficient infrastructure
  - Recycling of waste materials;

chnology that does not contain hazardous

- Creation of environmental awareness regarding the use of local material supply in a sustainable manner.

5. Use of ICT for teleconferencing rather than face to face meetings will reduce the environmental impact associated with commuting.

**5.2.2 Negative Environmental Impacts:** The anticipated negative environmental impact of the electronic network technologies to be applied in the e-transform project will focus on three aspects: energy, resources and pollution.

1. Energy and Power consumption: The implementation and expansion of the e-Transform services in the country will increase energy use since activities which were previously executed manually will be replaced with the use of electronic systems.

2. Resources: This includes acquisition, distribution, installation, use and disposal of ICT equipment. This relates especially to the ability to enable full network system connectivity across the country from highly-populated urban areas to remote scarcely-populated areas rural.

As much as possible, the physical components of the project will utilize existing infrastructure such as buildings and existing electrical connections. Where these are inadequate or nonexistent, they will be upgraded or new facilities will be provided.

3. Pollution from e-waste material: This relates to the disposal and management of potential hazardous substances from e-waste.

Thus, the detailed potential negative environmental factors and the proposed mitigation interventions are presented in the Matrix Table 5.

Impacts with the Mitigation Factors

| ISSUE                        | POTENTIAL IMPACT  | MITIGATION  |
|------------------------------|---|---|
| Increased Energy Consumption | <p>- There is a possible of increased electricity consumption from the expansion and increased use of electronic systems.</p>   | <ul style="list-style-type: none"> <li>- This will be mitigated by ensuring that energy efficient resources with minimum negative environmental impact are used.</li> <li>- Existing systems and facilities will also be replaced with new energy efficient brands.</li> <li>- Institute education and training to increase awareness, knowledge, skills and attitudes leading to environmentally responsible practices and behaviours</li> </ul>   |
| Electric and magnetic fields | <p>- Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device, such as power lines and electrical equipment. Electric fields are produced by voltage and increase in strength as the voltage increases. Magnetic fields result from the flow of electric current and increase in strength as the current increases.</p> <p>Public Concern about EMF</p> | <ul style="list-style-type: none"> <li>- There is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. So evidence indicates that it is not sufficient to merit serious concern. However, while the evidence of adverse health risks is weak the following will be ensured to remove all doubts.</li> <li>- Evaluation of potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP);</li> <li>- Average and peak exposure levels will remain below the ICNIRP recommendation for General Public Exposure;</li> <li>- Take into account public perception about EMF issues by consulting with the local community during the siting process</li> </ul> |

| ISSUE               | POTENTIAL IMPACT   | MITIGATION   |
|---------------------|--|--|
|                     |  | of antenna towers.   |
| Disposal of e-waste | Some e-waste contain hazardous material which when not properly disposed can create environmental hazard to health.  | <ul style="list-style-type: none"> <li>-An asset management profile will be developed to reflect disposal, re-use or recycling of e-waste.</li> <li>- Information dissemination mechanisms will be put in place to communicate what is hazardous waste in e-products and how it should be disposed off.</li> <li>- Possibilities for waste recycling will be developed as a first option.</li> <li>- Recycling decisions will take into consideration the National Government Policy guidelines.</li> <li>- Dispose of waste in accordance with the guidance in <i>Electronic Scrap - A Hazardous Waste</i></li> </ul> |
| Hazardous materials | <p>The rapid expansion of network technology via wireless technologies can expose the user to harmful electromagnetic radiations.</p> <p>There might also be need to the use of backup power systems consisting of a combination of batteries (typically lead-acid batteries) and diesel-fueled electricity backup generators.</p> | <p>As much as possible there will be co sharing of existing facilities however should the need be to expand such facilities, good engineering practice in the siting and installation of directional links (e.g., microwave links) to avoid building structures will be ensured</p> <p>-The project will use electronic equipment that meets international phase out requirements for hazardous materials content and implement procedures for the management of waste from existing equipment according to the hazardous</p>  |

| ISSUE                | POTENTIAL IMPACT  | MITIGATION   |
|----------------------|---|--|
|                      | <p>There might also be spillage from fuel storage for stand by generators</p>   | <p>waste guidance in IFC’s General EHS Guidelines.</p> <p>-Quality control of the Network facilities for the levels of electromagnetic radiation on the environment will be monitored by the Ghana Atomic Energy to ensure the removal of risk to the environment. .</p> <p>-The project will implement procedures for the management and disposal of lead acid batteries, including temporary storage, transport, and final disposal as described in IFC’s General EHS Guidelines;</p> <p>-Fuel delivery procedures will ensure spill prevention and control plans.</p> |
| <p>Public safety</p> | <p>Communities may be exposed to safety risks in the event of falling masts</p> | <p>- Periodically assess the structural strength of masts</p>  |

| ISSUE                          | POTENTIAL IMPACT  | MITIGATION   |
|--------------------------------|---|--|
| Occupational Health and Safety | <p>The occupational health and safety hazards include the following:</p> <ul style="list-style-type: none"> <li>· Electrical safety</li> <li>· Electromagnetic fields (EMFs)</li> <li>· Optical fiber safety</li> <li>· Elevated and overhead work</li> <li>· Fall protection</li> <li>· Confined space entry</li> <li>· Motor vehicle safety</li> </ul> <p>Occupational health and safety hazards may occur during construction, maintenance, and operation of telecommunications facilities, and must be carefully managed.</p> | <p>- Occupational health and safety hazards will be carefully managed with adequate training, provision of protective clothing and other safety devices.</p> |

### 5.2.1 Positive Social Impacts

#### 1. Improve efficiency of work systems by the:

- Automation of tedious work to reduce time and paperwork.
- Development and integration of databases to
- Increased transparency in operation and service delivery of Government agencies:
- Dissemination of Government rules and procedures
- Create transparency in judicial and administrative work.
- Enhance confidence building among the citizens and the government machinery.
- Put procedures online so that transactions can be easily executed and monitored
- Eliminate the need for intermediaries eg. easy access to Identification cards, All notifications and circulars can be put online, so that cases can be disposed faster.

#### 2. Improved Service Delivery

- Enhance access to information and communication across large distance. Eg. Less time in completing transactions.
- Reduce costs associated with travel for citizens to interact with government, thereby enhancing government citizen relations for better governance and
- Improve government ability to deliver service to larger segment of population and to reach underserved areas who are mostly among the poor in critical areas like health and education.

#### 3. Citizen Empowerment

geographic and socioeconomic range of

- Deliver essential services to citizens.
  - Provide unserved communities (those with limited access to government agencies) with a new channel to receive government services and information and
  - Reduce the brokerage power of intermediaries.
4. Reduction in Administrative Burdens for businesses
- Enhance public service delivery eg. Provision of employment to small-scale entrepreneurs who can afford their own service and provide 'per call' service to those who can't
  - Provide faster access to government and less time needed to interact with government agencies.
  - Reduce interlocutors between government and individual.
5. Cost Reduction and Budget Savings
- Reduce Cost of transactions for government processes. · Producing same output at lower total cost.
  - Provide Better Control of Expenditure · Improves resource management

**5.2.2 Negative Social Impacts:** Some of the anticipated negative social impacts of the project and the proposed mitigation factors are presented in Table 6.

Impacts and Mitigation

| ISSUE  | POTENTIAL IMPACT  | MITIGATION   |
|--|---|--|
| Skepticism about introduction of New Systems of Work | Employers might view the new system or method as a threat to their current position in the organization and to their job security and might show opposition or resistance during trial projects or test sessions.   | This will be addressed through effective capacity development and orientation on the benefits of the project. The implementation plan will incorporate the most hesitant staff in the implementation phase, making the project benefits will be made visual for staff so they can help overcome the initial hesitation towards change. |
| Lack of confidence in products                       | There might be a lack of confidence in the products, the personal ability of employers to learn and adapt to new technologies and business processes together. To increase the likelihood of success, efforts will be concentrated on cultivating broad-based buy-in throughout the agencies. | There will be a shared, system-wide understanding of the impact and benefits of the technology implementation. Commitment building efforts will not involve only Information Technology areas or specific executives, but include employees in all operating units impacted by the initiative.   |
| Doubt about Information Security                     | There might be doubts about the security of information which can significantly slow down the implementation of the system  | The project will be mindful of this and will ensure that the necessary security measures are part of an integrated system. In addition, the public will be sensitized to assure them of security of their data and other information.  |

**5.2.3 Estimated Costs:** The estimated cost of the ESMF is as summarized in Table 7

Table 7: Summarized estimated budget for Environmental and Social Impact Management

| Measures                                 | Actions  | Responsible             | Costs USD |
|--|--|-------------------------|-----------|
| Introduction of Energy Efficient Systems | Engagement of consultancy services for a market survey for the identification of efficient ICT and electrical installation system                                    | MOC                     | 35,000    |
| Electric and magnetic fields             | Evaluation of potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP); | MOC/Ghana Atomic Energy | 50,000    |

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|                                |  |                                 |                |
|--------------------------------|--|---------------------------------|----------------|
|                                | service to develop an equipment recycling of the disposal of e waste   | MOC                             | 20,000         |
| Public safety                  | Establish a project safety team to periodically assess the structural strength of masts                                      | MOC/District Assemblies and NCA | 100,000        |
| <b>Training</b>                | Capacity development for all beneficiary agencies in the use of ICT equipment, changes in operation systems, maintenance etc | All project stakeholders        | 150,000        |
| <b>Awareness</b>               | Adoption of a combination of information and education disséminations methods  | MOC                             | 300,000        |
| Occupational Health and Safety | Educational on safe work methods and supply of protective clothing   |                                 | 20,000         |
| <b>TOTAL</b>                   |  |                                 | <b>675,000</b> |

## 6.0 IMPLEMENTATION AND MANAGEMENT

### 6.1 ENVIRONMENTAL MONITORING AND MANAGEMENT PLAN

The achievement of the environmental requirements will be determined by

- Compliance with the necessary legal obligations for environmental clearance where necessary.
- Compliance with mitigation and other environmental and social requirements;
- Effective management of unanticipated or residual environmental impacts that arises during the project implementation phase
- How far contractors adhere to required environmental and social principles, standards and commitments; and
- Extent to which project monitoring and reporting requirements are met.

This section presents the management framework for necessary for the ESMF implementation. The successful implementation of the ESMF will depend on the commitment of the MOC, Ministry of Health, Ministry of Education, NIA, the Judiciary Service, local support, affected regional/district environmental officer and the beneficiary communities. The responsibility for the monitoring of implementation of environmental mitigation factors is as presented in Table 8.

Environmental Management Plan

|   | BE MONITORED  | ACTION TIME FRAME   |
|---|---|---|
| EPA   | <ul style="list-style-type: none"> <li>- Overall Environmental Performance of the project</li> <li>-Monitoring of radiation levels</li> <li>-Assess agency performance on mitigation measures</li> </ul>  | Throughout project life cycle                               |
| NCA   | <ul style="list-style-type: none"> <li>-Environmental impacts from mast installations</li> </ul>  | On-going responsibility throughout operational phase.       |
| MOC   | <ul style="list-style-type: none"> <li>- Overall Environmental Performance of the project</li> <li>-Coordination of activities of other agencies</li> <li>-Se up data security systems</li> <li>-Monitor implementing agencies for standards adherence</li> <li>- Manage Community relations</li> </ul> | Responsibility runs throughout the project life cycle       |
| Implementing Agencies eg.<br><br>MOH<br>MOE<br>Judiciary Service<br>NIA<br>NHIS | <ul style="list-style-type: none"> <li>- Environmental management of Project within their agencies</li> <li>- Implementation of mitigation measures for energy efficient equipment procurement</li> <li>- Environmental performance of mitigation measures</li> </ul>                                   | On-going responsibility throughout project operation phase. |
| Standards Control Agencies<br>GCAA<br>Ghana Atomic Energy                       | <ul style="list-style-type: none"> <li>-Ensure that specifications on mast installations are met</li> <li>-Issue appropriate permits for mast installations</li> <li>- Monitor maintenance of towers</li> <li>-Monitor radiation levels</li> </ul>  | Responsibility as an when required                          |
| District Assemblies/Local Communities   | <ul style="list-style-type: none"> <li>- Monitor negative environmental impacts.</li> </ul>   | Throughout project life cycle                               |

## 6.2 KEY INSTITUTIONAL FRAMEWORK

The successful implementation of the environmental mitigation measures will depend on the institutional arrangement that is set up to effectively manage the process. The key implementing institutions are:

#### ommunication (MOC):

ting agency for the ESMF. It will ensure that the appropriate permits are secured where applicable for clearance before the commencement of the expansion programme. Issues associated with land acquisition, compensation and conformity with laid regulations will also be implemented by the MOC together with the affected district assemblies (DA's), representatives of the affected communities and the EPA. It will specifically liaise with the EPA for submission of the completed assessment forms, for inspection and other processes leading to granting of the permit for sub-projects. Where possible the MOC will engage communities in public consultations on issues relating to land acquisition, displacement etc.

The MOC will also ensure that appropriate specifications of ICT equipment acquisition are developed before procurement. It will develop operational protocols for effective environmental best practices at the operational phase. It will monitor implementing agencies for standard compliance and determine the way forward in challenging situations.

**6.2.2 Role of District Assemblies:** The individual District Assemblies (DA) within which the projects will be executed will assist with the implementation of the environmental and social management plans. The DA's will be actively involved with issues relating to project sitting and land acquisition. Where applicable, issues involving community consultation for land acquisition will be led by the DA's. It will be involved with ensuring adequate compensation for displaced persons if applicable. It will issue the relevant building permits required for the sub-projects under their jurisdictions. The DA's will also be directly involved with the management of environmental and social issues during the project implementation through as monitoring.

#### **Representatives:**

Representatives will review and approve environmental impact assessment and management plans for the project. The EPA will be responsible for issuing appropriate environmental permits for the project. The representative will ensure that technical issues are undertaken should concerns for such issues arise. The EPA will ensure that community consultations are conducted to address the social needs of the affected communities. The representative will also be a member of the project monitoring team and review reports on environmental mitigations.

#### **6.2.4 Project Contractors, Consultants and Private Sector:**

Project Contractors, Consultants and Private Sector will be responsible for the actual execution of the environmental mitigation factors during construction under the supervision of the MOC, the DA's, the environmental safeguard consultants as well as the consultants who will supervise the civil works if such are involved in the project.

#### **6.2.5 Project Oversight:**

An oversight committee made up of representatives of all the affiliated agencies will be established to coordinate and oversee the implementation of the project. The committee will be chaired by the MOC and will perform the following functions amongst others.

- Provide guidance on strategic, policy and implementation issues;
- Coordinate activities of the ministry and other stakeholders involved in the project implementation;
- Review and approve work plans, budget and progress reports;
- Review and discuss quarterly project progress reports and make necessary recommendations; and

wards achieving the project's objectives and take  
sary.

**6.2.6 Capacity Building:** Capacity building in environmental and social assessment and management will be essential for the ESMF implementation. The institutions need to understand the purpose of the safeguard documents, their expected roles and the extent to which the ESMF and will facilitate the respective statutory functions. This will engender the required collaboration for the implementation of the documents. The objectives of the capacity building efforts will include to:

- Support the mainstreaming of the environmental and management issues in the sub-projects; and
- Strengthen all stakeholders in the environmental and social issues and other aspects of the implementation of sub-projects.

The target groups for training include:

- Project coordinators;
- Project teams;
- Consultants;
- District staff
- EPA staff in the regional and district offices;

The broad areas for capacity building include the following:

- Project screening/initial assessment techniques, screening tools, legislation and procedures;
- General project planning and management inter-faced with environmental and social assessment and management;
- Procurement and infrastructure development and acquisition
- Environmental (and social) management (including monitoring, environmental and social audit, etc.);



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al Safeguards report preparation and other

- Public participation techniques and procedures;
- Public awareness creation/educational techniques (on environmental, social and health issues)

Public Consultations: Consultations will be held with agency representatives at the regional, district and local levels, civil society organizations, NGO's and other local representative groups to explain the concept of the e- Transform Ghana project to solicit their support in the project implementations and the benefits it has to offer.

#### **6.2.7 Monitoring Program:**

Monitoring is designated to check the effective implementation of the proposed mitigation measures. It will be based on:

- i) Meeting the requirements specified in the various laws and regulations.
- ii) Commitment of MOC and the affiliated agencies to effectively implement and follow up the proposed mitigation measures.
- iii) Meeting the requirements of the other laws and regulations related to environmental protection using the following key verifiable indicators
  - Periodic radiation test,
  - Periodic structural test of masts and towers
  - Waste disposal strategies;
  - Safety and security measures;
  - Employment opportunities and
  - Consistency of annual environmental reporting



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## 7.0 CONCLUSIONS

The implementation of the e-Transform Ghana project is aimed at increased efficiency within the operation of selected Government agencies. It is aimed at the development of an electronic network system that can serve a variety of purposes for better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The approach is to create multiple channels of service delivery through effective data capture; development of effective linkages for ease of data exchange, easy access to data, effective control of data usage and update with efficient monitoring.

The use of electronic network systems not only constitute an industry in their own right but they also pervade all sectors of the economy and contribute towards socio economic development. Their production and use have environmental consequences. The extent to which such systems affect environmental sustainability is dependent on the mitigation factors implemented to check negative environmental impacts. This ESMF has therefore defined the necessary environmental mitigation measures for the expansion of the e-Transform Platform Project.