



GHANA INFRASTRUCTURE PLAN (GIP) 2018-2047

HIGHLIGHTS



NATIONAL DEVELOPMENT PLANNING COMMISSION



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Independence Square, Accra. buzzghana.com

OVERVIEW

Purpose

Development of well-planned and adequately maintained world-class network of infrastructure is critical for Ghana's quest to becoming a solidly developed country by its centenary year of 2057. The Ghana Infrastructure Plan (GIP) encapsulates Ghana's long-term vision and strategic direction for infrastructure development and provides the physical manifestation of social and economic ideals. It, therefore, serves as a framework to address infrastructure challenges, using a combination of effective policies, institutional and financing measures, within a 30-year planning horizon. It provides a coordinated and integrated approach to infrastructure planning, prioritization, funding and delivery by engaging with key stakeholders across government, industry and communities while prioritizing Ghana's Infrastructure needs from the perspective of a prosperous nation.

Approach

The preparation of the plan involved a wide consultation of all stakeholders including the general public, students, persons with disability, civil society organisations, the private sector, professional institutions, political parties, key political leaders and all levels of government.

Analyses, projections and drafting of the plan involved a team of industry experts comprising of professionals from government institutions, the private sector, professional organisations and consultants. While the plan has been prepared with a strategic thrust to transform the nation into a solidly developed country, it accommodates regional and international commitments such as:

- The West Africa Growth Ring (WAGRIC) Master Plan;
- The African Union Agenda 2063;
- The United Nations Sustainable Development Goals - 2030 Agenda; and
- Nationally Determined Contributions of the Global Climate Change Agreement.

Infrastructure performance of Ghana in key sectors regarding stock, access rates, quality and costs of services was compared to those in Middle-Income Countries (MICs) and High-Income Countries (HICs). Table 1 shows international infrastructure benchmarks for Lower Middle Income, Upper Middle Income and High Income Countries, while Table 2 shows the provisional infrastructure targets by 2057 as Ghana transitions to achieve high-income status.

Table 1: Benchmarking Ghana's Infrastructure access with international average benchmarks

SECTORS	INDICATOR	YEAR	GHANA	LMIC	UMIC	HIC
ENERGY	Electronic power consumption per capita (kWh)	2015	348	743	3,214	8,508
	Electricity generated by hydropower (% of total)	2015	64	16.8	20.1	13.1
	Access to Electricity (% of total population)	2012	64.1	78	98.7	99.8
	Electric power transmission and distribution losses (% of output)	2015	23	15.22	8.7	7
	Electricity production from coal sources (% of total)	2013	0	46.1	51.9	6.12
	Electricity production from natural gas sources (% of total)	2013	10.4	20.88	17.13	11.77
	Electricity production from nuclear sources (% of total)	2008-13	0	4.99	3.79	26.39
	Electricity production from oil sources (% of total)	2013	0	6.58	3.08	17.7
	Electricity production from oil, gas and coal sources (% of total)	2013	10.4	73.56	72.11	3.74
	Electricity production from renewable sources, excluding hydroelectric (% of total)	2013	0.023	3.75	3.07	61.49
FOREST COVER	Proportion of land area covered by forest (ha/annum)	2016	40.1	28.7	28.8	34.5
	Annual Rate of Deforestation	2016	-0.3	0.4	0	0
WATER	Internal Freshwater resources per capita (cu. m)	2015	1,131	3,065	6,594	11,319
	Access to improved water source (% of total population)	2016	89	90	95	99
	• Rural (% of Rural population)	2016	84	87	91	97
	• Urban (% of Urban population)	2016	93	94	97	99
	Households using piped water as major source of drinking water (%)	2015	15	52	80	96
	• Rural (% of Rural population)	2015	9	42	67	97
	• Urban (% of Urban population)	2015	20	67	88	97
	Households reporting access to a flush toilet (%)	2016	15	52	80	96
	• Rural (%)	2016	9	42	67	93
• Urban (%)	2016	20	67	88	97	
ICT	Mobile Cellular subscriptions (per 100 people)	2014	114.8	87.6	101.4	125.7
	Individuals using the Internet (% of population)	2014	18.9	22.6	47.7	80.6
	Fixed broadband subscriptions (per 100 people)	2014	0.27	2.35	12.71	30.62
	Fixed telephone subscriptions (per 100 people)	2014	1	4	-	42
	Internet users (per 100 people)	2014	18.9	22.6	-	83
	Ownership of a Personal Computer (per 100)	2007	0.6	4.6	12.4	67.4
HOUSING	Proportion with access to secure housing (%)	2010	13.5			
	Population living in slums (% of urban population)	2014	38	30	0	0

Source: World Development Indicators 2015; Energy Commission



unicef.org

Table 2: Indicative Infrastructure Targets envisaged under the LTNDP

SECTOR	INDICATOR	BASE YEAR	BASELINE	TARGET (2047)
GENERAL	Nominal GDP US\$ Billion	2016	44	1,370
	Per Capita GDP US\$	2016	1,546	27,195
	Population in Millions	2010	24.659	51
	Urbanisation Rate	2012	51	70
	Annual Rate of Deforestation % (93,790 ha/v)	2006	-1.7	0
SHELTER	Household Size	2010	4.6	3.5
	Number of Dwelling Units (in Millions)	2010	5.818	13.8
	Number of Rooms (in Millions)	2010	5.467	23.39
	Proportion with access to secure housing (%)	2010	13.5	90
	Population living in slums (%)	2014	38	4
ENERGY	Access to Electricity (% of total population)	2012	64.1	99
	Total Energy Capacity (Installed) - MW	2016	3,800	50,168
	Total Electricity production / GWh (Installed)	2016	16,401	297,200
	Electricity consumption per Capita/KWh	2015	348	5,800
	Total electricity losses (%)			
	- Transmission	2016	4.5	3
	- Distribution	2016	22.8	8
Renewable Energy stock (% in energy mix)	2016	0.7	18	
Renewable Energy (Total installed in MW)	2016	28	9,000	
IRRIGATION	Total Irrigated land per arable land (ha)	2012	12,042	834,804
	Irrigated lands per arable land (%) [7.93 mil]	2012	0.15	10.5
WATER SUPPLY	Internal Freshwater resources per capita /m3	2015	1,131	2,262
	Total Freshwater resources per capita/m3	2015	1,941	2,911
	Per Capita Water consumption (litres)	2012	50	300
	Access to improved water source (% of total population)	2016	89	99
	Households using piped water as major source of drinking water (%)	2015	15	90
	Non-Revenue Water (% of water produced)	2014	50	10
	SANITATION (SEWERAGE)	Access to Safe Sanitation (%)	2014	15
Households reporting access to flush toilet (%)	2013	14	70	
Sewerage network system (% of safe sanitation)	2013	3	50	
Solid Waste Collection (% of waste generated)	2012	20	90	
TRANSPORT	Length of road network (km)	2014	71,419	253,000
	Road Density (road-km/1000 km2)	2014	300	1,060
	Road network in good condition (% network)	2014	35	70
	Ratio of paved to total Road network %	2014	23	70
	Vehicular population per 1000 persons	2015	64	250

Source: GLSS 6; Energy Commission and GIP Team, 2017

Implementation

The infrastructure plan, with several flagship projects, would be implemented in conjunction with the Long-term National Development Framework and the National Spatial Development Framework. The plan would rely on an integrated approach to infrastructure delivery required by an industrialising and urbanising society. For example, the increasing numbers of high-rise buildings in Accra (certain to be repeated in the rest of the country in the near future) would have implications for electricity demand, water usage, sanitation services as well as traffic management in the host of communities. This must be handled in an integrated manner through coordinated planning across various government ministries, departments, agencies, metropolitan, municipalities and district assemblies.

Scope

The Ghana Infrastructure Plan covers the following areas:

- Energy Infrastructure
- Transport Infrastructure
- Water Infrastructure
- Human Settlements and Housing
- Social, Civic and Commercial Infrastructure
- ICT Infrastructure
- Institutional Development Framework
- Financing
- Results Framework



ENERGY INFRASTRUCTURE

The availability of affordable and adequate energy, particularly electricity, would be critical for rapid socio-economic development. The rapid growth in electricity demand (as the population grows), low water levels for the Akosombo and Kpong dams, as well as lack of coherent energy sector planning have been at the heart of the country's electricity challenges, characterised by load-shedding, over the past 20 years. These challenges have disrupted economic activities and social lives and are partly responsible for the under-performance of the economy over the years. Against this background, the pursuit of energy security for Ghana in all its forms constitutes a central component of the Ghana Infrastructure Plan

ELECTRIC POWER

- a. Total power installed would increase from 3,800MW in 2018 to 50,168MW by 2047, with energy generation of 297,200GWh.
- b. Ghana's electricity generation per capita is expected to increase from 348kWh in 2016 to 5,850kWh in 2047.
- c. Transmission and distribution losses are expected to reduce from 4.5% and 22.8% in 2016 to 2.5% and 6% by 2057, respectively.
- d. Clean coal technology based on the highly efficient ultra-supercritical and supercritical methods will be introduced from 2020, and a total of 12,200MW (24%) of power will be developed from coal sources.



RENEWABLE ENERGY

- a. The share of renewable energy (solar, wind, wave & biofuel) in the national energy mix would increase from 1% in 2018 to 18% in 2047, increasing generation from 38MW to 9,000MW over the period.
- b. Renewable Energy Authority will be established.
- c. Dependence on biomass as main fuel for thermal energy applications (cooking and heating) will be significantly reduced.
- d. Local content and participation in the renewable energy industry will be promoted.
- e. Effective implementation of the Renewable Energy Master Plan is expected to create about 370,000 jobs along the value chains of the various interventions.
- f. The use of roof space in commercial, industrial, public and private facilities for solar installations will be strongly encouraged and promoted.
- g. Renewable energy research and development (R&D) priorities will be established and implemented in partnership with relevant stakeholders.



NUCLEAR

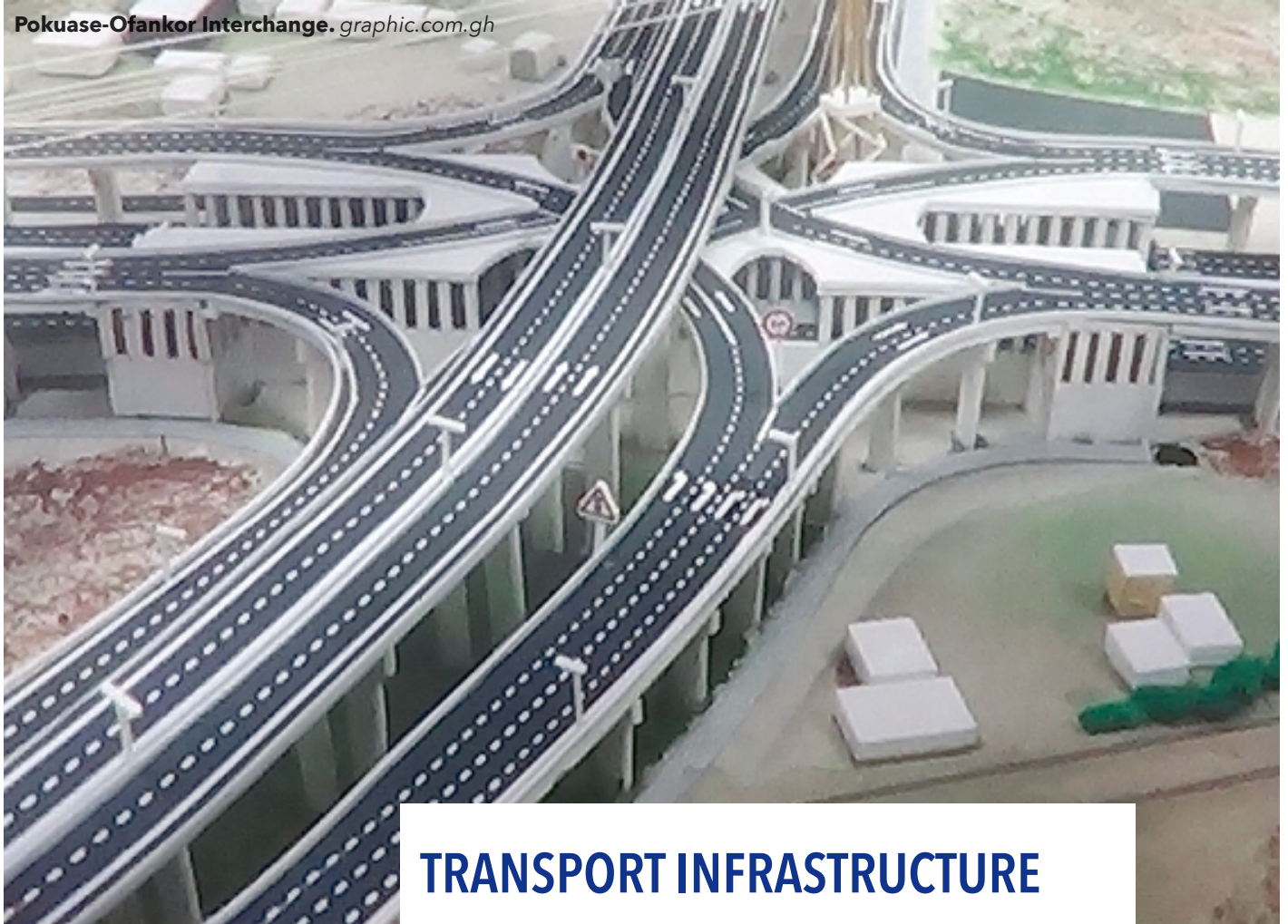
- a. About 12,800MW (26%) of nuclear power would be developed, serving as prime caseload energy to scale-up industrialisation and manufacturing by 2047.
- b. Ghana's first nuclear power plant will be in operation by 2029. This is expected to significantly reduce the cost of power for domestic and commercial use.



PETROLEUM

- a. The Jubilee Field is being developed in phases, thus there are more wells to be drilled, which will increase the oil and gas production and extend the plateau off production profiles in the country.
- b. There is a long term proposition for the exploration and development of the voltaian basin because of its significant onshore oil resource potential.
- c. The capacity of the Tema Oil Refinery will be increased from 45,000bpd to 60,000bpd by 2025.
- d. A new 60,000bpd capacity oil refinery is to be constructed in the Western Region, to process domestic oil finds in the offshore basins.
- e. The means of transporting crude oil and its finished products from the supply source to the markets will continue to be via pipelines, road or marine vessels. The same will be used to transport domestically produced oil to the Tema Oil Refinery for processing.
- f. An oil utilization plan will be developed to define an allocation scheme for the various industries to help monitor oil demand and to avoid waste.
- g. To ensure supply security and cost reduction of petroleum products, the Ghana National Petroleum Corporation (GNPC) will initiate its own exploration and production business within the next 5-10years.
- h. The pipeline infrastructure that transports petroleum products will be expanded to gradually phase out road transportation of petroleum products.





TRANSPORT INFRASTRUCTURE

The country has a transportation system consisting of two large deep-water ports, a 947 km railway system, a 78,401 km maintainable road network, one international airport and eight regional airports and airstrips. Certain inefficiencies exist in the transport sector that pose a major threat to growth and development. First of all, there are no available alternatives to road transport for movement of bulk commodities, which could be better handled by rail. The railway system, which has limited coverage, serves only the southern part of the country, including Tema, and has lost most of its rolling stock over the years. The vision of achieving a high-income status calls for the development of modern, integrated, reliable, resilient, inclusive, safe and sustainable transportation infrastructure throughout Ghana.

ROAD TRANSPORT

- a. Expand road network size from 78,401km to 253,000km by 2047
- b. Increase paved roads from 23% to 70% by 2047
- c. Increase in vehicular population from 70 vehicles per 1,000 persons to 250 per 1,000 persons within the same period (much lower than current high-income average of 600 vehicles per 1,000 persons).
- d. Create extensive bus routes to connect major cities across the country as part of Mass transport system.
- e. Link urban areas in regional capitals by multi-lane carriageway

- f. Increase in tolled roads to generate funds for maintenance and rehabilitation works
- g. Construct three (3) long-span bridges across the Volta Lake
- h. Widen more than 1,700km of roads in heavily trafficked urban areas
- i. Create four (4) circular roads and nine radial arterial roads to serve the GAMA metropolis
- j. Create by-passes in towns on the central and coastal corridor trunk road network (Kumasi, Konongo, Tamale, Bolgatanga, Cape Coast and Takoradi)
- k. Establish Traffic Signal Control Systems, including Intelligence Transport System, Bus Information and Management System in major cities to manage the intermodal system
- l. Create nationwide charger networks in cities and countrysides for electric cars to reduce emissions
- m. Reduce number of persons killed and seriously injured (KSI) in road traffic crashes by 50 percent by 2020

AVIATION



- a. Develop new international aerotropolis at Prampram under public-private partnership to complement increasing traffic at Kotoka International Airport
- b. Develop a new Kumasi Airport and related services at Ankaase
- c. Develop and upgrade regional airports to facilitate trade and tourism
- d. Regulate land developments within the vicinity of airports to stimulate investments in airport related service industries.
- e. Link underground sub-urban railway line from Adenta to Accra Central to the Kotoka International Airport, and the emerging airport-city related service industries
- f. Attain International Aviation Safety Assessment Category 1 status for aviation safety.
- g. Enhance interconnectivity between the country's airports

Image - Unknown Source

MARITIME



- a. Develop the Boankra Inland Port to reduce pressure at Tema Port and trigger an increase in transit trade to landlocked countries.
- b. Direct railway link will be constructed from Tema Port to the Boankra Inland Port.
- c. Redevelopment of the Tema Shipyard and Drydock Facility into world class facility within the short to medium term will serve the growing marine and oil industries.
- d. Marine fishing ports and landing sites would be developed in several coastal fishing communities.
- e. Development of the Buipe and Akosombo ports to improve navigational services.

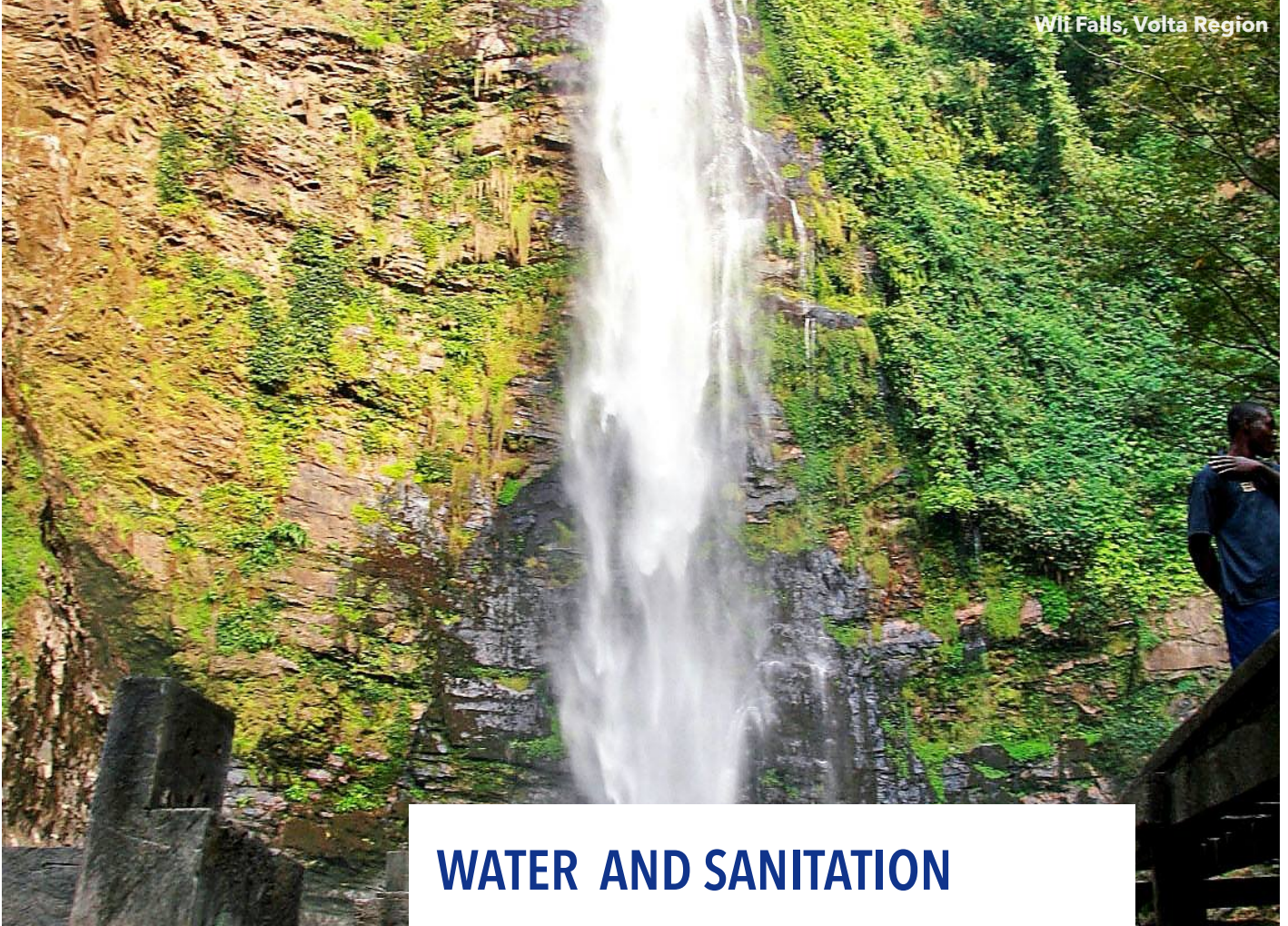
- f. The average number of passengers crossing the Volta Lake is expected to increase from 5 million passenger trips in 2018, to 45 million by 2035. New ferry, tramping services and modern boat-building facilities will be developed to ensure safety on the lake.
- g. Development of infrastructure and tourism services in areas around Akosombo, Digya park and other selected urban centers around the Volta Lake would provide alternative means of livelihoods.

RAILWAY

- a. Provide 4,007 km of standard gauge railway lines and additional lines for the sub-urban networks in four major cities.
- b. Construct 84km of railway line from Tema to Akosombo.
- c. Ghana's first underground railway line will be constructed along the Liberation Road/ Independence Avenue, between Accra and Adenta in the short to medium term to reduce traffic resulting from expansive Airport service related infrastructure in Airport phases 1,2 and 3 projects.
- d. The sub-urban railway networks in Accra, Kumasi, Tamale and Sekondi-Takoradi will be planned and developed as part of the overall redevelopment of the cities under the National Spatial Development Framework (NSDF).
- e. A large number of north-south and transversal rail lines, as well as the Trans ECOWAS railways route will be developed during the plan period.
- f. It is expected that a large number of direct, indirect and related jobs will be created with the construction of the railways and related activities.



Tema-Akosombo Railway project.
constructionreviewonline.com



WATER AND SANITATION

Numerous economic and social activities in both the private and public sectors rely on the supply of clean water and adequate sanitation (e.g. large retail, wholesale, food, and agro-processing sectors). However, almost a third of the population does not have access to safe water and more than two-thirds do not have access to adequate sanitation.

Managing the urban water delivery system is fraught with such challenges as intermittent disruptions, inadequacy in extending supply to new customers, and weak financial performance by the Ghana Water Company Limited (GWCL). With most facilities being obsolete, the ability to deliver water to an urban population, growing at an average annual rate of 4.2%, is unduly stretched. The increasing urban population also puts a strain on limited infrastructure, which, in the case of sanitation calls for improved systems for the collection, management and disposal of urban waste in order not to aggravate the pollution of water bodies and create flooding.

WATER RESOURCES MANAGEMENT

- a. Appropriate watershed management schemes would be implemented to ensure the protection of water source.
- b. Water demand will increase and exert pressure on water availability, unless there are corresponding increases in water conservation and other management techniques. Hence, a lot of trees will be planted to conserve the nation's water resources.

WATER SUPPLY

- a. The water demand per capita will increase from 75 liters per capita per day to about 300 liters per capita per day by 2047.
- b. Non-revenue water losses will reduce from an urban average of 50 percent to less than 15 percent by 2047.
- c. A total number of 204 new Peri-Urban Water Supply Systems have been targeted for development during the plan period.
- d. One hundred and seventy-one (171) Peri-Urban Water Supply Systems have been targeted for upgrading by 2047.
- e. Seven (7) new Urban Water Supply Systems have been targeted for development during the plan period.
- f. A total of forty-two (42) Urban Water Supply Systems have been targeted for upgrading during the plan period.
- g. Effective use of sea water desalination in target developments will be given lower priority due to the availability of adequate freshwater sources and the associated high cost of harnessing sea water.



INTEGRATED WASTE MANAGEMENT

- a. Generally, as the country reaches over 70 percent urbanisation by 2047, it is expected that there would be a shift from use of on-site sanitation systems to off-site (sewerage) systems across the country.
- b. It is projected that about 32 million tonnes of municipal solid waste would be generated per annum during the plan period, up from about 9 million tonnes.
- c. Facilities and services for 95 percent source separation and minimisation of waste would be provided on individual, institutional and commercial premises.
- d. Infrastructure for 100 percent effective management of Municipal Electrical and Electronic Waste (MEEW) would be provided.
- e. Infrastructure for 100 percent collection and transportation of municipal waste would be provided.

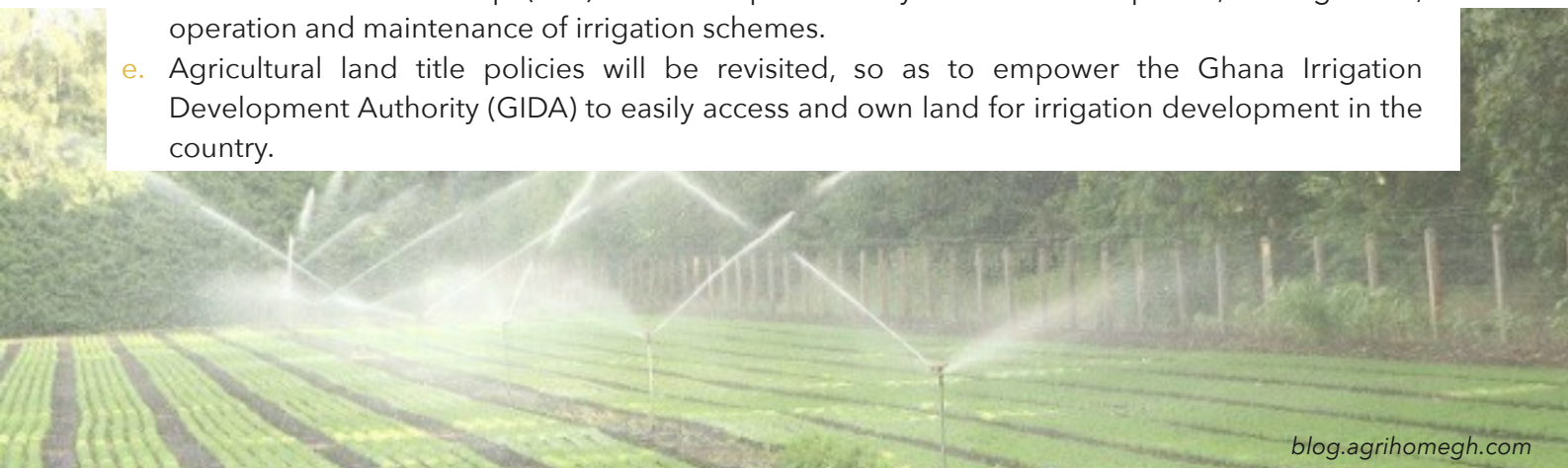


- f. A total of about 149,000 km length of urban sewerage pipelines and 8,660 km length of rural and community sewers will be laid by 2047.
- g. Waste minimisation, reuse, recycling and recovery procedures and practices will be adopted and facilitated in all sectors of society.
- h. Transfer stations of 300 tonnes per day minimum capacity will be provided within 20 km travel distances to support collection and transfer of solid waste from the generation points to the treatment and disposal sites.
- i. An estimated 9 km² of land area would be required for landfilling per annum, assuming that about 15 percent of the waste to be treated is residue for landfilling.
- j. Local entrepreneurship will be developed and partnerships will be established to take advantage of job opportunities in waste minimisation, recycling and reuse.
- k. The energy potential and nutrient value of agricultural wastes will be exploited to support industrial and agricultural production.
- l. Private sector direct investments in infrastructure and services will be facilitated through various contracts that include BOOT, BOT, BOO, etc., to substantially increase sector financing.

IRRIGATION INFRASTRUCTURE

Ghana's irrigation potential is largely underdeveloped and characterised by obsolete technologies, which has a direct impact on agricultural productivity and water use efficiency. Out of a total 1.9 million hectares, only about 221,000 hectares are under irrigation. The Ghana Irrigation Authority (GIDA) has 56 irrigation schemes covering about 12,000 hectares, with the private sector managing most of the irrigation schemes. To ensure long-term food security and adequate supply of produce to feed agro-based industries as well as the export market, irrigation infrastructure will need to be expanded and modernised. The GIP envisages the following:

- a. During the plan period, about 822,762 hectares will be put under various irrigation systems to form about 54.9 percent of the estimated irrigable land available countrywide.
- b. By making total net revenue projections from four selected irrigated crops, cumulative net revenues of US\$ 40 billion will be obtained at the end of the plan period.
- c. About 300 megawatts of power would be made available by the end of 2047 to operate the irrigation systems on 12-hour irrigation cycles per day.
- d. Public-Private Partnership (PPP) will be exploited fully for the development, management, operation and maintenance of irrigation schemes.
- e. Agricultural land title policies will be revisited, so as to empower the Ghana Irrigation Development Authority (GIDA) to easily access and own land for irrigation development in the country.



DRAINAGE, FLOOD CONTROL AND COASTAL PROTECTION

Poor enforcement of physical planning regulations, the uncontrolled sprawling of urban areas and the low investment in drainage and flood protection infrastructure has led to frequent episodes of flooding, especially in urban areas, with large economic, social and environmental costs. The increasing intensity of storm surges, attributed to climate change, and sand winning along the coast have increased the vulnerability of these areas to erosion and flooding, with the attendant adverse impact on shelter, livelihoods and infrastructure and major roads. Increasing urbanisation and predicted impacts of climate change call for improved drainage construction and management, flood control, and protection measures for human settlements, critical infrastructure, and coastal areas. The GIP envisages the following:

- a. There will be provision of underground storm sewers to replace open drain channels.
- b. Existing manual gauging sites will be upgraded to modern telemetric gauging sites.
- c. Flood risk assessment maps will be prepared as additional requirement for development and building permit approval.
- d. Engineering design and construction of drainage structures will be implemented to control, delay/reduce or withstand flooding.
- e. Flood data collection and flood studies will be carried out on nation-wide basis.
- f. Major drainage channels like the Odaw and Aboabo Rivers running through the cities shall be carefully managed to harness efficient land use, urban planning, environmental, economical and tourism potential.
- g. Civil and cultural systems for water resources management will be developed to ensure the proper planning, evaluation, monitoring and funding of water resources projects that are coming up in the SADA zones.
- h. New institutional arrangements will be adopted for better coordination of the overlapping activities in the management of drainage, flood control and coastal protection.
- i. An inter-agency group to focus on coastal management programmes will be established.
- j. An integrated approach will be adopted to solve coastal flood shocks requiring coordination among key stakeholders, including traditional authorities and civil societies.
- k. The focus will be on financing and investing in coastal protection and capacity-building programmes, including awareness and sensitisation and supporting the development of new coastal policies and regulatory frameworks.
- l. Coastal communities will be educated on how to combat coastal erosion and adapt to climate change. Local governments and NGOs could play key roles in this direction.





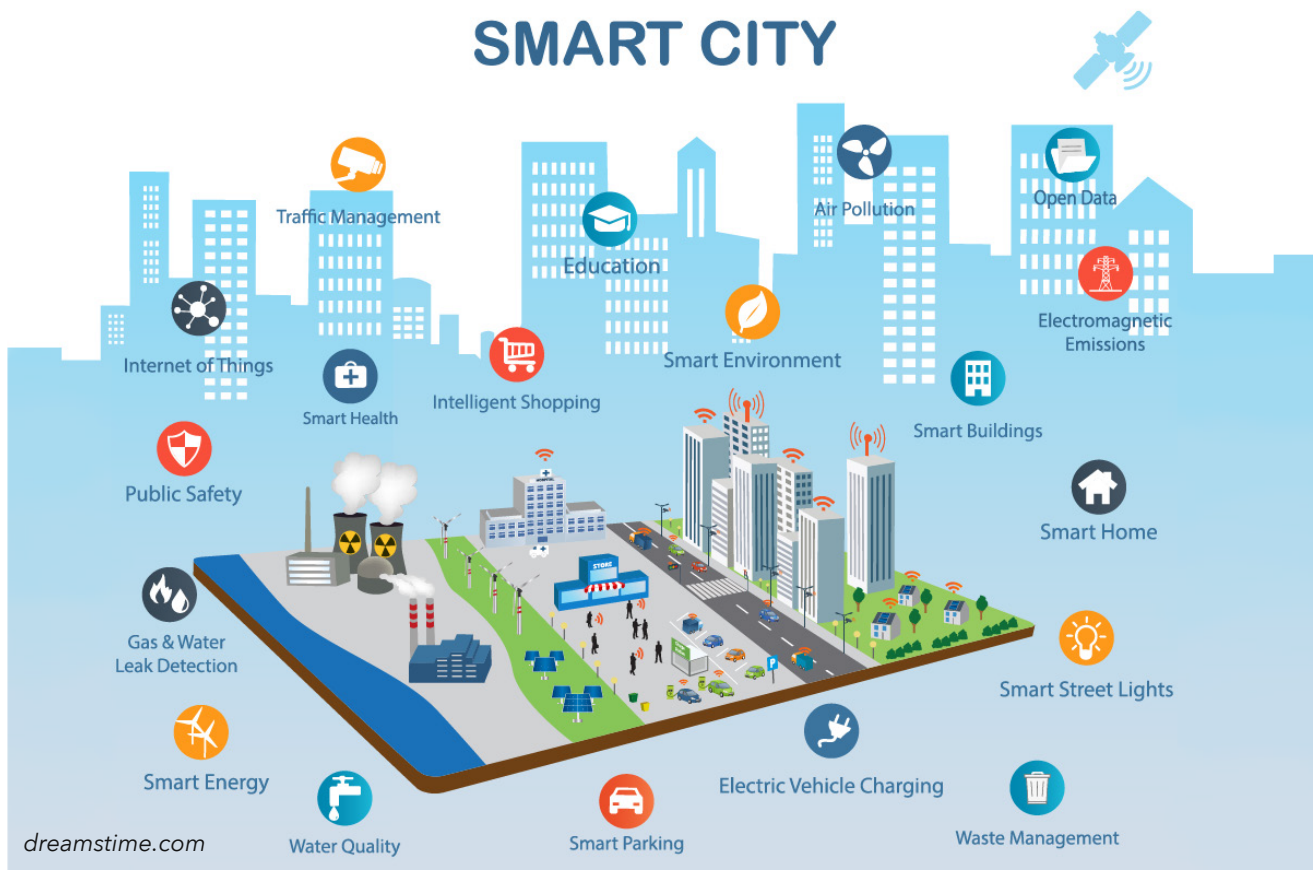
HUMAN SETTLEMENTS AND HOUSING

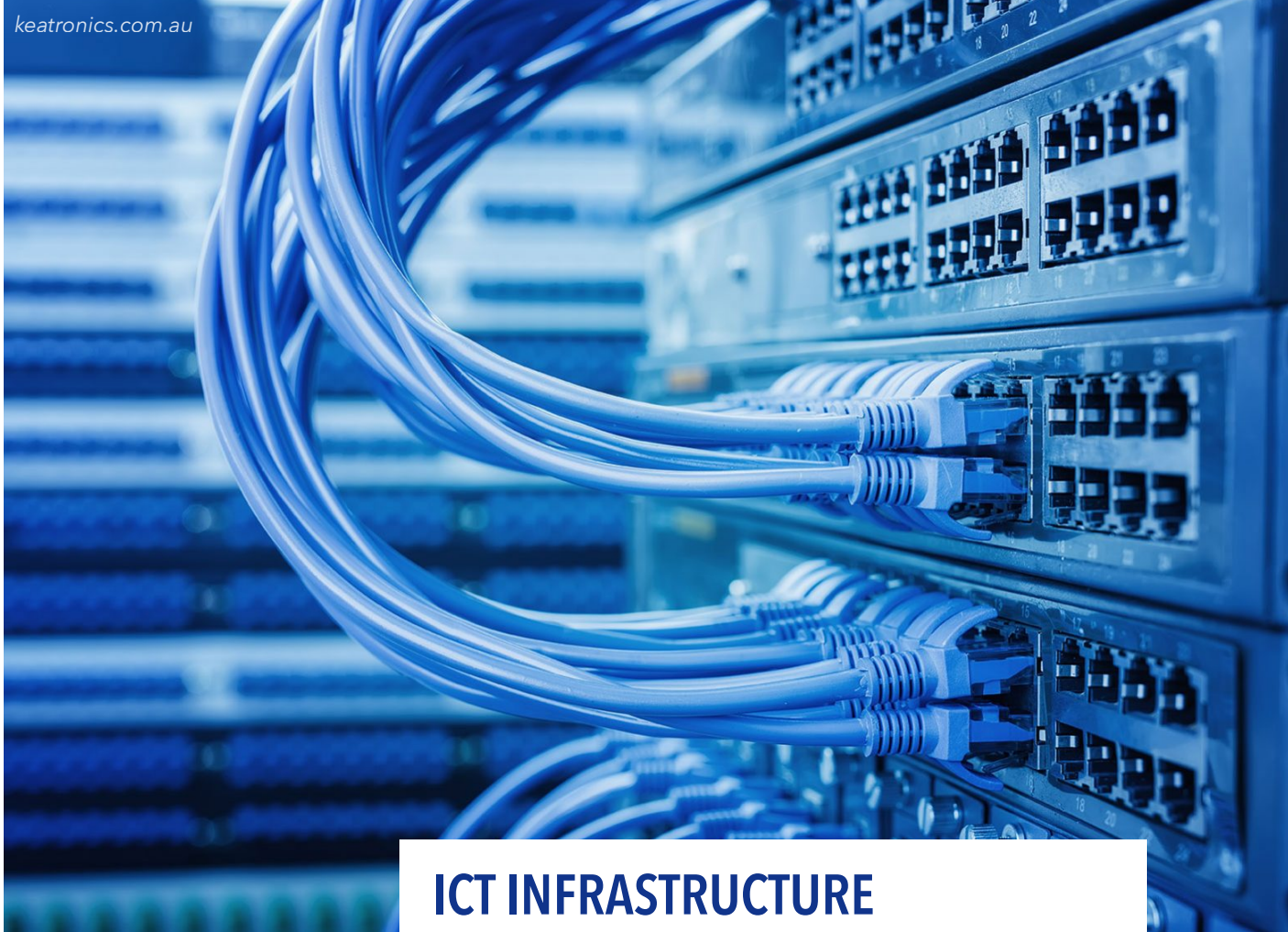
Central to Ghana attaining the vision of high-income status is careful planning and management of human settlements. Generally, settlement patterns in Ghana are denser, with relatively concentrated population and economic development in the southern areas. Settlements in the northern areas are relatively sparse and less supportive of certain types of infrastructure that require a critical mass of population in particular areas. Settlements in urban areas have, therefore, been experiencing rapid population expansion, outpacing infrastructure supply and maintenance. Of particular concern is the current housing deficit of more than 2 million rooms. The demand for housing far outpaces supply, resulting in relatively high cost of housing. This has contributed to the emergence of slums and informal housing delivery systems, with such issues as overcrowding, decline in the quality of housing and associated facilities.

HUMAN SETTLEMENTS

- a. The NSDF proposes that grid-based system be adopted for urban development and expansion, to promote compact settlement structures, increase connectivity and foster mixed land uses.
- b. Nucleated and dense human settlements would be promoted as they make infrastructure provision relatively effective than the elongated and sparsely populated northern parts of the country.
- c. Future housing provision will be linked to functional urban regions/networks to meet demands based on the anticipated growth in these areas. Programmes will be implemented towards re-engineering existing cities to meet sustainable city principles.

- c. Each regional capital would develop a city structure plan by 2021, and each district by 2022. These plans will incorporate principles of design, excellence, strong environmental management, economic strength, good governance and improved social well-being, with clearly defined strategies towards ensuring sustainability.
- d. A green infrastructure network as proposed by the NSDF will be implemented nationwide as city boundaries. This could also be used for recreational purposes, while serving as carbon sink and ecological network.
- e. Green belts to serve as boundaries and check unrestricted sprawl of large built up areas, among others, will be implemented and enforced in all cities, towns and villages. A Legislative Instrument will enforce this.
- f. An agricultural growth corridor, as proposed by the NSDF will be implemented, by converting areas with huge unrealised agricultural potential into commercial agriculture at an industrial scale.
- g. A model modern city is proposed to be sited in a pre-determined location in the country. This city will be designed as a smart city, with specific functions to serve as a growth pole for the development of the area within which it will be situated.
- h. Towards building cities that are attractive, liveable, secure and sustainable, a slum upgrading, phasing out and prevention agenda dubbed: "Make slums history", will be pursued and implemented.
- i. The Urban Regeneration programme as well as programmes to phase out slums will seek to leverage about 250,000 hectares of land across the country to provide housing within the existing urban fabric. This will address about 30% of the land needs for housing over the plan period.





ICT INFRASTRUCTURE

Since the turn of the new millennium, Ghana has been active in developing ICT policies and strategies to promote socio-economic development. These efforts have resulted in appreciable improvements in mobile and internet penetration, international and inland fibre optic connectivity as well as ICT parks and incubators. However, the nation is yet to exploit the major opportunities offered by these resources, especially in the areas of e-government, e-business, e-commerce, e-health, e-education and e-research. With an overarching goal to attain a high-income status by the year 2057, the role of technology and ICT cannot be over-emphasised. Existing policies and laws will have to be amended regularly to keep pace with the rapid changes in the ICT sector.

INFORMATION AND COMMUNICATION TECHNOLOGY

- a. Expand access to broadband services for all citizens and households
- b. Extend fibre optic cables to all rural, remote, and underserved areas as well as hospitals, schools, public places, buildings and homes
- c. Establish ICT parks with an accompanying ICT incubator as a hub for nurturing young entrepreneurs, developing innovative ideas, generating revenue as well as creating employment in the country
- d. Develop and implement an online GIS application system
- e. Establish at least one Business Processing Outsourcing (BPO) centre in each regional and district capital for job creation and revenue generation
- f. Complete the e-transform project and all related components

CONSTRUCTION INDUSTRY DEVELOPMENT

Construction is the mechanism through which infrastructure is delivered. The construction industry will therefore play a key role in the implementation of the Ghana Infrastructure Plan, from the provision of residential infrastructure to transportation, energy and housing, among others. The industry is currently experiencing several challenges such as: absence of a central agency responsible for the development of the industry; inability of contractors to access adequate and affordable capital; payment delays by clients; weak classification and certification systems for registration of contractors; lack of regulation of contractor conduct and performance; shortage of skilled workers; poor enforcement of regulations and statutes; lack of effective control on proliferation of sub-standard construction materials and products; poor management practices and environmental management at construction sites; and limited use of local building materials.

The GIP proposes to elevate the industry to a comparable global construction industry capable of supporting the transformation agenda of Ghana. These include, pursuing a construction industry development strategy to promote stability, foster economic growth and international competitiveness of local industry players, create sustainable employment, and address any historic imbalances as it generates new construction industry capacity. Similarly, the model for transformation of the construction industry is the proposal to establish a Construction Industry Development Authority (CIDA) that would work towards Construction Business Development as well as Technology and Manpower Development. These key pillars will represent the short, medium and long-term priorities for development of the construction industry.



PROPOSED HIGH-IMPACT PROJECTS

The GIP proposes a number of projects for each infrastructure sub-sectors. The following are proposed catalytic projects with high impacts:

ENERGY

- Power generation facilities with a total installed capacity of 50,168MW by 2047 and energy generation of 297,200GWh.
- Increment in the supply of renewable energy in the grid from 38MW (1%) of total generation in 2015 to 9000MW in 2057, representing 18% of total installed capacity.
- Construction of a new 60,000bpd capacity oil refinery in the Western Region, to process domestic oil finds in the offshore basins.
- Establishment and operationalisation of Ghana's first nuclear power plant by 2029

TRANSPORT

ROAD

- Construction of freeway along the coast of Ghana as part of the Lagos-Abidjan corridor project
- Construction of a four-lane freeway between Accra and Kumasi
- Construction of by-passes in towns on the central and coastal corridor trunk road network (Kumasi, Konongo, Tamale, Bolgatanga, Cape Coast and Takoradi) Construction of four (4) circular roads and nine radial arterial roads to serve the GAMA metropolis
- Establishment of a Traffic Signal Control System, including Intelligence Transport System, Bus Information and Management System in major cities to manage the intermodal system
- Establishment of nationwide charger networks in the cities and the countryside for electric cars to reduce emissions
- Construct three (3) long-span bridges across the Volta Lake

MARITIME

- Development of Buipe and Akosombo ports to improve navigational services
- Development and operationalisation of the Boankra Inland Port
- Construction of marine fishing ports and landing sites

RAILWAYS

- Construction of sub-urban railway networks in Accra, Kumasi, Tamale and Sekondi-Takoradi as part of the overall redevelopment of the cities
- Construction of 84km, Tema to Akosombo railway line
- Revitalization of Western Railway Line (Takoradi-Awaso-Kumasi), Eastern Railway Line (Tema-Boankra-Kumasi) in the short term, and new construction of railway from Kumasi up to northern areas in the mid and long terms

AVIATION

- Development of new international aerotropolis at Prampram
- Development of an underground sub-urban railway line from Adenta to Accra Central and link it to the Kotoka International Airport, and emerging airport-city related service industries
- Development of a new Kumasi Airport and related services at Ankaase
- Establishment of a National Airline for Ghana

WATER AND SANITATION

- Development of 204 new Peri-Urban Water Supply Systems by 2047
- Development of facilities and services for 95 percent source separation and minimisation of waste for individual, institutional and commercial premises.
- Provision of infrastructure for 100 percent effective management of Municipal Electrical and Electronic Waste (MEEW).
- Provision of infrastructure for 100 percent collection and transportation of municipal waste
- Lay about 149,000km length of urban sewerage pipelines and 8,660km length of rural and community sewers by 2047.
- Development of irrigation systems to cover about 822,762 hectares which will constitute 54.9 percent of the estimated irrigable land available countrywide.
- Provision of underground storm sewers to replace open drain channels.

HUMAN SETTLEMENT AND HOUSING

- Cities without slums - "Make Slums History"
- Revitalisation of distressed mining towns
- Re-planning of Informal Industrial Enclaves
- Establishing Green Infrastructure Networks

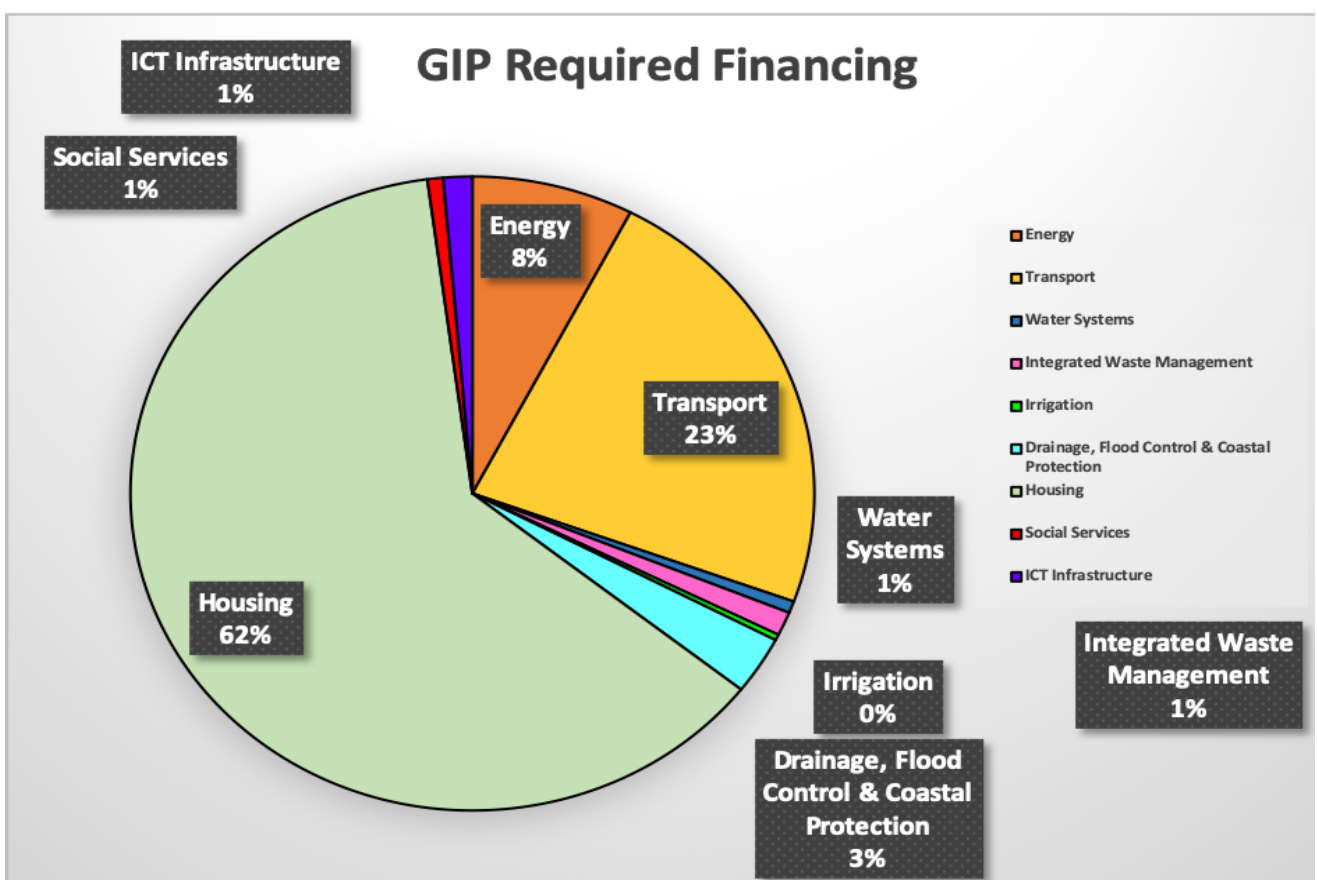
ICT

- Extend fibre optic cables to all rural, remote, and underserved areas as well as hospitals, schools, public places, buildings and homes
- Develop regional capitals into smart cities
- Establish ICT parks with an accompanying ICT incubator as a hub for nurturing young entrepreneurs, developing innovative ideas, generating revenue as well as creating employment in the country



FINANCING THE GHANA INFRASTRUCTURE PLAN

The GIP estimates that an amount of US\$1.1 trillion investment would be required for all the sectors to effectively implement these proposals from 2018 to 2047. Housing will require 62%, transport (23%), energy (8%), drainage, flood control and coastal protection (3%) and 1% for the other sectors except irrigation which will require less than 1% of the total investment. This measures up to US\$37.2 billion of annual infrastructure investment requirement for the next 30 years. In order to properly maintain these structures, a corresponding US\$237.4 billion would equally be needed.



Ghana's current revenue and expenditure cannot support the level of infrastructure development envisaged in the GIP. Official Development Assistance is projected to decline given the lower middle-income status of the country. The forgoing requires that we explore and secure a range of sustainable financing. In addition to the traditional sources of funding, the GIP proposes some strategies to significantly advance Ghana's development agenda. Key among these are: land financing and value capture, bulk construction materials; value addition to mineral wealth (Manufacturing); reducing illicit financial outflows and leveraging the Ghana Infrastructure Investment Fund to command significant share of the global infrastructure finance flows.

HIGHLIGHTS OF GHANA INFRASTRUCTURE PLAN

2018-2047



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