GH – INDC

Republic of Ghana

Ghana's intended nationally determined contribution (INDC) and accompanying explanatory note

September, 2015

1. Introduction

In preparing and submitting its INDC, Ghana is mindful of its international obligations as a Party to the UNFCCC while simultaneously pursuing a national development agenda that seeks to achieve the long-standing objective of becoming a fully-fledged middle-income economy. Ghana's response to the threats posed to this objective by the impacts of climate change has been to pursue coordinated domestic policy actions that in effect seek to develop a policy framework that integrates adaptation, mitigation and other climate related policies within broader development policies and planning in order to safeguard developmental gains from the impacts of climate change and build a climate resilient economy.

At the multilateral level, Ghana reaffirms its resolve to support global efforts to define a common future that seeks to safeguard the collective interest of all nations by supporting a global agreement that is fair, ambitious and balanced, respects the right of nations to pursue sustainable development, and above all gives equal opportunities to all nations and their citizens, to pursue and realise their future aspirations.

At the milestone 17th Session of the Conference of the Parties (COP) held in Durban, South Africa in December 2011, the Parties decided to "develop a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties" for adoption at the twenty-first session of the COP and for it to come into effect and be implemented from 2020. Parties agreed that their work will address inter alia, mitigation, adaptation, finance, technology development and transfer, transparency of action and support, and capacity building.

At COP 19 in Warsaw, Parties agreed to advance their work by focusing on the elements of the new agreement. The Warsaw Conference was also very significant in that for the first time in Decision 1/CP 19, Parties were invited to "initiate or intensify domestic preparations for their intended nationally determined contributions (INDCs), without prejudice to the legal nature of the contributions". The decision also requested the Ad Hoc Working Group on the Durban Platform for Enhanced Action to identify by the 20th session of the COP, the information that Parties will provide when putting forward their contributions, without prejudice to the legal nature of the contributions. Ghana holds the view that the INDCs should cover mitigation, adaptation, finance technology, capacity building and transparency and agrees with the common position of Africa that:

- The INDCs should conform fully with the Convention;
- Respect its differentiation between developed and developing countries;
- Build on established Convention obligations, particularly relating to means of implementation; and
- Enable developing countries, particularly, African countries, to fully participate in the global effort to achieve the Convention's objective, with regards to both mitigation and adaptation, in line with the Convention's provisions.

Ghana's INDC builds on other national documents prepared and submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in fulfilment of its obligations under the Convention. These include the National Communications, Biennial Update Reports, Nationally Appropriate Mitigation Actions (NAMAs) and Technology Needs Assessment (TNAs). Ghana sees finance as an essential part of the whole INDC process. The scope of finance from the developed countries must address mitigation, adaptation, and technology transfer and development in developing countries. It should not be solely focused on mitigation.

Ghana as a Party to the UNFCCC and also to the Kyoto Protocol is committed to meeting its commitments in order to contribute its fair share to the attainment of the objective of the Convention. In view of this and in accordance with Decisions 1/CP.19 and 1/CP.20, the Republic of Ghana is pleased to communicate its INDC and associated explanatory note to facilitate the clarity, transparency, and understanding of our contribution.

2. Ghana's contributions

Based on its national circumstances, Ghana has put forward mitigation and adaptation actions in its INDC. The inclusion of both mitigation and adaptation in the INDC resonate with the medium-term development agenda (Ghana Shared Growth Development Agenda II – GSGDA 2), the anticipated 40-year socio-economic transformational plan and the universal sustainable development goals. In all, 20 mitigation and 11 adaptation programme of actions[1] in 7 priority economic sectors are being proposed for implementation in the 10-year period (2020-2030). The implementation of the actions are expected to help attain low carbon climate resilience through effective adaptation and greenhouse gas (GHG) emission reduction in the following priority sectors:

- Sustainable land use including food security
- Climate proof infrastructure
- Equitable social development
- Sustainable mass transportation
- Sustainable energy security
- Sustainable forest management; and
- Alternative urban waste management.

These 31 programme of actions will drive the strategic focus of a "10-year post-2020 enhanced climate action plan" that would be developed after Paris. In the 10-year period, Ghana needs USD 22.6 billion in investments from domestic and international public and private sources to finance these actions. USD 6.3 billion is expected to be mobilized from domestic sources whereas the USD 16.3 billion will come from international support.

[1] "Programme of actions" are specific actions Ghana will implement in order to achieve the broad objectives set out in the "Policy actions"

2.1 Mitigation goal

Ghana's emission reduction goal is to unconditionally lower its GHG emissions by 15 percent relative to a business-as-usual (BAU) scenario emission of 73.95MtCO_2e[2] by 2030.

An additional 30 percent emission reduction is attainable on condition that external support is made available to Ghana to cover the full cost of implementing the mitigation action (finance, technology transfer, capacity building). With this external support, a total emission reduction of 45% below the BUA emission levels can be achieved by 2030 (see figure 1).

The following INDC policy actions[3] will be implemented to achieve the mitigation goals

Sectors	INDC Policy Actions	No. of Programme of Actions
Energy	Scale up renewable energy penetration by 10% by 2030	5
	Promote clean rural households lighting	1
	Expand the adoption of market-based cleaner cooking solutions	2
	Double energy efficiency improvement to 20% in power plants	1
Transport	Scale up sustainable mass transportation	1
AFOLU	Promote Sustainable utilization of forest resources through REDD+	5
Waste	Adopt alternative urban solid waste management	3
Industry	Double energy efficiency improvement to 20% in industrial facilities	1
	Green Cooling Africa Initiative	1

2.1.1 Outlook of emissions trajectory up to 2030

Without prejudice to the outcome of our emission reduction goal, the outlook of Ghana's emission trajectory for 2020 to 2030 is projected as follows:

- Under BAU emissions are expected to rise from 19.53 MtCO_2e in 2010 to 37.81 MtCO_2e in 2020, to 53.5 MtCO_2e in 2025 and 73.95MtCO_2e in 2030.

- Under the unconditional emission reduction goal, emissions are expected to decrease by 12 percent and 15 percent relative to the BAU emission levels in 2025 and 2030 respectively.

[2] Million tonnes carbon dioxide equivalent
[3] Refer to the Annex 1 for the detail description on mitigation Policy actions and the Programme of actions that come with it.

- A similar emission trajectory is anticipated under the "conditional emission reduction goal" except that the degree of deviation relative to the BAU emission is higher compared to the projections under the unconditional goal. Under the "conditional emission reduction goal", emission are expected to decrease by 27 percent and 45 percent relative to the BAU emissions in 2025 and 2030 respectively.

2.1.2 Explanatory note on assumptions and methodology

Base year	2010
Mid-year	2025
Target year	2030
Timeframe	Time of implementation of emission reduction programmes is up to 2030 subject to review in 2025.
Type of "Target"	Emission reductions from projected emissions resulting from the deviation of BAU emissions for the year 2030.
Scale	Economy-wide
Basket of gases	Carbon dioxide (CO_2), Methane (CH_4), and Nitrous Oxide (N_2O). Abatement of fluorinated-gases (HFC-22 and HFC-410) from stationery air-conditioners is included.
% of emissions covered	100% of total national GHG emissions.
Sectors covered	Priority sectors: energy including transport, industrial process and product use, AFOLU and waste.
Baseline scenario	Business as usual emissions[4] estimated to be 73.95MtCO_2e by 2030 starting from baseline emission of 19.53MtCO_2e in 2010. This excludes any future developments in the extractive industry. The baseline scenario includes Ghana's intentions to explore opportunities using clean coal technology in public electricity generation mix to meet its energy security objectives.
Emission reduction scenario	GHG emission projections for 2030 starting in 2010. The unconditional emission reduction goal is based on the implementation of 2 transformational mitigation actions[5]. Whereas, the conditional emission reduction goal assumes the implementation of 18 transformational mitigation actions (table 1) over the 10-year (2020-2030) period.
Global Warming Potential (GWP)	The carbon dioxide equivalent (CO_2e) was calculated using the 100-year global warming potentials (CO_2 = 1, CH_4 = 21, N_2O=310, HFC-22 =1,780 and HFC-410 =2,060) in accordance with the IPCC 2nd Assessment Report. The GWPs were used on the national GHG inventory to establish historical emission trend from 1990 to 2012.

[4] BAU is subject to revision before 2020.

[5] Ghana is mobilizing $7.2billion commercial facility to develop Sankofa-Gye Nyame transformational gas project in partnership Vitol and ENI. Ghana takes note of this action as part of its unconditional contribution. Detail estimates of both GHG impacts and co-benefits will be provided before 2020.

Contribution of International Market based mechanisms	Ghana intends to generate compliance grade emission reductions units from actions in the waste and energy sectors and REDD+. Access to market-based mechanisms where these emission reduction units would be fungible and tradable forms an important component of the strategy to mobilize long-term support for the INDCs. These market-based mechanisms must have robust accounting rules and standards, avoid double-counting and ensure environmental integrity.
Methodology for estimating emission	**Historical emission trends -** Historical GHG emissions from 1990 to 2012 were estimated using the 2006 IPCC guidelines. The 2010 baseline GHG emission was derived from the 22-year time series. **Energy sector projections** - The BAU and emission reduction scenarios for the energy sector were developed for the sectors using the "Long-range Energy Alternatives Planning System" (LEAP) software. The analysis was done using data from the strategic national energy planning exercise by the Energy Commission and from the Ghana Standard Living Survey by Ghana Statistics Service. Data on sectoral activities, economic demographic and technology penetration were derived from the sources named above. **Industrial sector projections** - A comprehensive modeling approach was used. The underlying assumptions of BAU and emission scenario were based on the following predictors: population, GDP, urbanization, electrification rate, penetration rate of domestic refrigeration and annual stocks of air-conditioners. **Waste sector projections** - BAU and emission reduction scenarios for the waste sector were generated using IPCC waste model. Projection was limited to methane gas management in engineered landfills. Data on variation in urban population, efficiency of urban waste collection and landfill gas recovery were based on national statistics. **AFOLU sector projections - BAU** and emission scenarios were estimated based on IPCC AFOLU accounting rules using COMAP[6] tool and the Forest Carbon Partnership Facility (FCPF) methodological framework.

[6] Comprehensive mitigation assessment process, 1999. Ernest Orlando Lawrence Berkeley National Laboratory, United States of America.

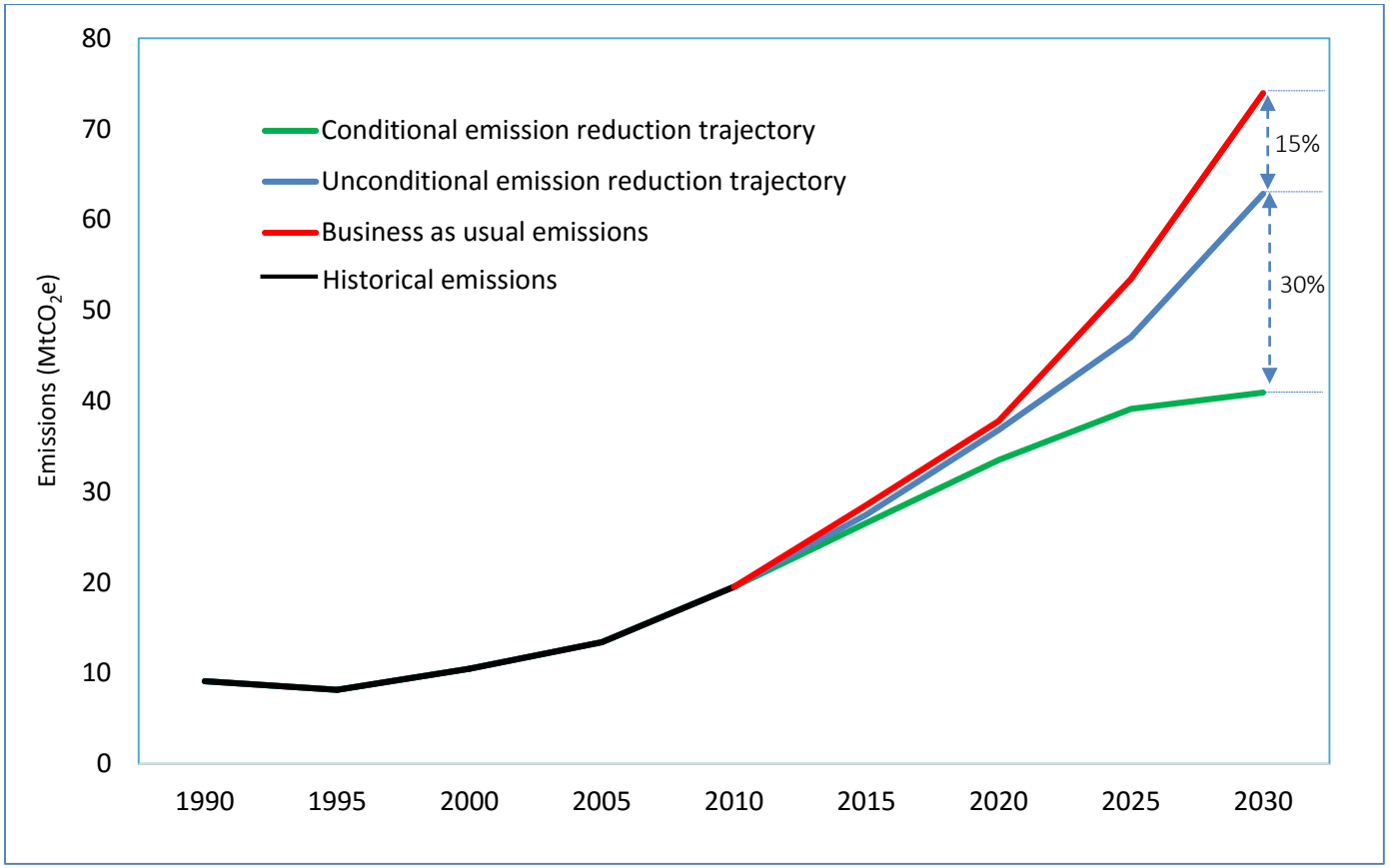

Figure 1: Emission reduction trajectory

2.2 Adaptation Goal

The long-term goal of Ghana's adaptation is to increase climate resilience and decrease vulnerability for enhanced sustainable development. Adaptation under Ghana's INDC is informed by:

- good governance and inter-sectoral coordination,
- capacity-building, the role of science, technology and innovation,
- adequate finance from both domestic sources and international cooperation,
- promoting outreach by informing, communicating and educating the citizenry; and
- adhering to accountable monitoring and reporting.

The following priority adaptation policy actions will be implemented in order to achieve Ghana's INDC adaptation goal.

Sector	Strategic Area	INDC Policy Actions	No of Programme of Actions
Agriculture and food security	Sustainable land use	Agriculture resilience building in climate vulnerable landscapes	3
Sustainable forest resource management		Value addition-based utilization of forest resources	2
Resilient Infrastructure in built environment	Climate resilient strategic infrastructure	City-wide resilient infrastructure planning	1
		Early warning and disaster prevention	1
Climate change and health	Equitable social development	Managing climate-induced health risk	2
Water resources		Integrated water resources management	1
Gender and the vulnerable		Resilience for Gender and the Vulnerable	1

Some of the priority adaptation policy actions we have presented will yield positive synergies with mitigation policy actions[7].

[7] Refer to the Annex 2 for the detail description on adaptation policy actions

3. Means of Implementation

3.1 Investment Requirements

In the 10-year period, Ghana intends to mobilize nearly USD 22.6 billion investment from both domestic and international public and private sources. USD 6.3 billion domestically (28.3% of total investment) will be mobilized nationally whereas the USD 16 billion will come from international support.

Out of the USD 22.6 billion investment, USD 9.81 billion (representing 45 % of the total investment) is needed for mitigation whereas the remaining USD 12.79 billion[8] will be required for adaptation.

For mitigation, the USD 9.81 billion is the total investment cost for implementing the 20 transformational mitigation actions over the 10-year period (2020-2030). Out of the USD 9.81 billion, Ghana will mobilize USD 2.02 billion (21% of the total investment cost) to finance the two unconditional INDCs. An additional USD 7.79 billion will be needed to finance the remaining 18 mitigation actions in order to achieve more ambitious emission reductions in the 10 year period.

For Adaptation, Ghana will mobilize USD 4.21 billion (34%) at the national level. The remaining USD 8.29 billion is the international contribution Ghana is looking for in order to meet the cost of implementing its adaptation actions.

3.2 Sources of Finance

No	Sources	Indicative Amounts (Billion) - ($)	% of total investment
Domestic sources			
1	National Budget	1.4	6.2
2	Corporate Social Responsibility	1.7	7.5
3	Commercial facilities	3.2	14.2
International sources			
3	Green climate fund	5.0	22.1
4	Other multilateral funds	1.1	4.9
5	Bilateral agreements	2.8	12.4
6	Private capital investment	3.8	16.8
7	International carbon market	3.6	15.9
Total		22.6	100

[8] The cost of adaptation is indicative. Revised cost from financial analysis will be presented before 2020

3.3 Technology and Capacity Needs

Without the requisite technology, the technical capacity and favorable conditions that stimulate innovation, Ghana will not have the capability to fully implement its INDC. In this regard, Ghana will be looking for international partnerships to take advantage of the opportunities for technology development and transfer and continuous up-skilling especially in the priority INDC sectors.

4. Monitoring Report and Verification (MRV)

Ghana recognizes that an MRV system is the cornerstone to ensure the successful implementation of its INDC mitigation and adaptation actions.

Ghana's MRV system for the INDC will be an integral part of the existing national development monitoring and evaluation structures which incorporates sector-based periodic information review through Annual Progress Report (APR) system. The MRV for the INDC will build on the existing APR system by enhancing the technical functionalities and with proper institutional coordination. This will bring about transparency and accountability in the implementation of Ghana's INDC actions.

The MRV system will be deployed to track progress towards achieving INDC goals as well as any modifications in the priority policy actions that will be implemented to attain the INDC goals that have been put forward.

5. Fairness and Ambition

Ghana is of the view that the mitigation and adaptation actions in the INDC it has put forward represents a reasonable level of responsibility it can take as its share of the global effort taking into account its socio-economic circumstances. In this regard, Ghana considers its INDC to be fair and ambitious for 4 main reasons:

- Ghana undertakes, for the first time, a formal emission reduction obligation to control the growth of its GHG emissions, despite having only emitted 0.1% of global GHG emissions in 2012[9].

- With Ghana's GHG emissions per capita of 1.3tCO_2e[10], the full implementation of both unconditional and conditional mitigation contribution will lead to a 0.5 tCO_2e reduction in the country's per capita emissions to 0.8tCO_2e by 2030.

- As a developing country, the lack of fiscal space to finance priority issues including poverty reduction policies including investments in education, health and basic infrastructure constrains the country's effort to finance and implement climate mitigation and adaptation policies.

[9] CAIT 3.0 WIR's climate data explorer (http://cait.wri.org).
[10] Emissions included AFOLU sector.

- With the kind of urgent development Ghana needs and the level risk climate change poses to the strategic sectors of its economy such as agriculture, water, infrastructure etc, Ghana must focus on reducing the risk of climate change impacts.

6. National Planning Process

Ghana's INDC was prepared through a comprehensive and participatory process with high-level cabinet approval.

The INDC is anchored in the anticipated 40-year long-term development, the GSGDA II, National Climate Change Policy as well as the Low Carbon Development Strategy. Many national policies, laws and regulation will support implementation in the first 10-year period and beyond with the possibility of mid-term review in 2025.

The proposed measures to achieve the INDC goal will build on existing measures and strategies. The existing legal frameworks will have to be revised accordingly. These revisions are subject to approval by Ghana's Parliament. Details of the national policies and measures that will support the implementation of the INDC are presented in Annex 1 and Annex 2.

Additional Information

Annex 1: Mitigation Policy Actions and emission reduction actions[11]

INDC Policy Actions	Programme of Action	Supporting national policy & measures	Status	Investment Needs (mil $)	Co-benefits
Scale up renewable energy penetration by 10% by 2030	Increase small-medium hydro installed capacity up to 150-300MW	• National Energy Policy • National renewable energy Act (Act 832). • Set up feed-in-tariff for renewable energy technologies. • Established of national renewable energy fund • Design renewable energy purchase obligation. • Net metering scheme for households	Conditional	2,214	• Job creation opportunities through installation and maintenance of about 127.5 million man hours. • Reduced consumption of fossil fuel consumption for power generation. • Increased electricity access to rural communities and contributed to realize energy security. • The electricity demand saving of about 200MW
	Attain utility scale wind power capacity up to 50-150MW				
	Attain utility scale solar electricity installed capacity up to 150-250MW				
	Establish solar 55 mini-grids with an average capacity of 100kW which translates to 10MW				
	Scale up the 200,000 solar home systems for lighting in urban and selected non-electrified rural households				
Promote clean rural households lighting	Increase solar lantern replacement in rural non-electrified households to 2 million.	• Sustainable Energy Action Plan • National bioenergy strategy • Phasing out fossil fuel subsidies		300	• Avoided GH¢74 million subsidy on kerosene annually. • Kerosene savings to the nation of 60,000liters, 150,000liters and 390,000liters.

[11] Mitigation actions were selected based on the following key considerations. (1) Government is commitment (policy and financial wise) to get mitigation actions implemented and alignment with government priorities; (2) Enough baseline data exist with clear set targets that can be used for the GHG emissions modeling and assessment of co-benefits; (3) It is possible to estimate investment requirements(estimate pragmatic and reasonable budget) with clear sources of funding; (4) It is possible to estimate sustainable development benefits of the actions; (5) Technology and know-how are available to be deployed in the Ghanaian market; (6) Mitigation actions are already part of the list of 55 NAMAs submitted to the UNFCCC in 2010 and (7) There are existing analytical tools that can be adapted to suit Ghana's unique national circumstance.

Expand the adoption of market-based cleaner cooking solutions	Scale up adoption of LPG use from 5.5% to 50% peri-urban and rural households up to 2030. Scale up access and adoption of 2 million efficient cook stoves up to 2030	• Sustainable Energy Action Plan • National Natural Gas Master Plan. • National LPG Programme		0.6 50	• 39,500 hectares of woodland is saved from degradation. • Reduction in indoor pollution resulting from wood fuel usage. • Reduction in smoke related respiratory and eye diseases • Reduction in household cooking fuel expenditure • Job creation through the manufacture and sale of the efficient stoves
Double energy efficiency improvement to 20% in power plants	Scale up 120 MSCF[12] natural gas replacement of light crude oil for electricity generation in thermal plants.	• National Natural Gas Master Plan.	Unconditional	1,000	• Depending on demand scenarios, savings are estimated to be between US$67 million and US$610 million. • Projected fuel cost savings over the lifetime of the project are expected to be between US$94 million and US$109 million, based on the mid-level gas demand projection. • Income tax - Projected income taxes to be paid by WAPCo to Ghana over the lifetime of the project is in the range of US$466 million to US$588 million.
Scale up Sustainable mass transportation	Expansion of inter and intra city mass transportation modes (Rail and bus transit system) in 4 cities [13]	National Transport Policy	Conditional	1,201	• Number of trips by public transportation increased by 10% in the 4 cities. • Number of NMT trips increase by 5% in intervened areas.

[12] Million standard cubic feet

[13] This is a flagship transformational change INDC action but it is not included in the mitigation actions. Detail analysis on the scope and scale of the action will be provided before 2020.

mitigation					• Reduction in travel time by at least 8 minutes per trip by public transport. • Traffic congestion levels decreased.
Promote Sustainable utilization of forest resources through REDD+	Continue 10,000ha annual reforestation/afforestation of degraded lands	National Forest and Wildlife Policy. National plantation development strategy	Unconditional	1,050	• Annual 29,000 jobs created. • Annual production of 370 metric ton of staple food
	Double 10,000ha annual reforestation/afforestation of degraded lands translating to 20,000ha on annual basis.		Conditional	1,750	
	Support enhancement of forest carbon stocks through 5,000ha per annum enrichment planting and enforcement of timber felling standards.	National Forest and Wildlife Policy. Timber resource utilization regulation	Conditional	60	• Biodiversity conservation
	45%[14] emission reduction through result-based emission reduction programme in cocoa landscape.	National Forest and Wildlife Policy National REDD+ strategy	Conditional	2,067	• Increase 20,000 cocoa farmer incomes by doubling the average yield per hectare. • In reducing deforestation and degradation, the program will help to maintain and conserve the biodiversity that is found within the cocoa-forest landscape.
	Wildfire management in the transition and savannah dry lands in Ghana		Conditional	26	• Reduce emissions of short-lived climate pollutants. • Reduce deforestation and improve biodiversity conservation especially in the drylands. • Improve degraded lands for productive use.

[14] Provisional targets. Forest reference level is limited to avoided deforestation. New estimates will be submitted before 2020.

Adopt alternative urban solid waste management	Improve effectiveness of urban solid collection from 70% to 90% by 2030 and disposed all to an engineered landfills for phase-out methane recovery from 40% in 2025 to 65% by 2030	• National sanitation strategy. • National bioenergy strategy. • National renewable energy Act (Act 832) • Environmental Protection Act (Act 490) • Environmental Assessment Regulation (LI. 1652) • Sustainable Energy Action Plan.	Conditional	15	• Job creation of about 9 million man hours for 15 years based 250 people working for 8 hours /day. • Improved urban sanitation and waste management. • Improved agricultural yield through the availability of organic fertilizer. • Reduced inorganic fertilizer bill to government
	Scale up 200 institutional biogas in senior high schools and prisons nation wide			5	
	Double the current waste to compost installed capacity of 180,000tonne/annum by 2030[15].			60	
Double energy efficiency improvement to 20% in industrial facilities	Scaling up of installation of power factor correction devices in 1,000 commercial and industrial facilities (capacitor banks).	• National Energy Policy • Power factor surcharge for bulk electricity consumers. • Sustainable Energy Action Plan.	Conditional	8.4	• Reduction in electricity demands and expenditure. Direct electricity cost saving to consumers. With an average monthly maximum demand savings of $ 300 avoided power factor surcharge.
Green Cooling Africa Initiative	Abatement of fluorinated-gases (HFC-22 and HFC-410) from stationery air-conditioners	• National ODS phase-out programme. • Management of ODS and product regulation, 2005 (LI. 1812)	Conditional	0.3	• Phase-out ozone depleting substances.

[15] Detail analysis on the scope and scale will be provided before 2020.

Annex 2: Adaptation Policy Actions

INDC Policy Actions	Programme of Actions	Supporting national policy & measures	Investment Needs (mil $)	Status
Agriculture resilience building in climate vulnerable landscapes	Modified community-based conservation agriculture adopted in 43 administrative districts	Food and Agriculture Sector Development Policy Ghana's Medium-term Agriculture sector investment plan Ghana Agriculture Investment Programme	799	Unconditional
	Scale up penetration of climate smart technologies to increase livestock and fisheries productivity by 10%.		1,119	Unconditional
	Promote innovations in post-harvest storage and food processing and forest products in 43 administrative districts.		1,270	Conditional
Value addition-based utilization of forest resources	Governance reform for utilization of forest resources for sustainable energy use and biodiversity business.	National bio-energy strategy. Sustainable energy for all action plan National Forest and Wildlife Policy	767	Unconditional
	Manage 413,000ha fragile, ecologically sensitive and culturally significant sites in 22 administrative district in the forest and savannah areas.		512	Unconditional
City-wide resilient infrastructure planning	Building standards for strategic infrastructure in housing, transport, coastal, waste management, telecommunication and energy) adopted in 10 urban administrative regions.	Local Government Act 462. National Building Regulation	3,558	Conditional
Early warning and disaster prevention	Expand and modernize the current 22 synoptic stations based on needs assessment, and increase the number to 50 stations for efficient weather information management	Ghana Meteorological Agency Act 682.	403	Conditional
Managing climate-induced health risks	Strengthen climate related disease surveillance in vulnerable communities in 3 Districts.	National Health Policy	919	Conditional
	Adopt climate change informed health information systems including traditional knowledge on health risk management.		492	Unconditional
Integrated water resources management	Strengthen equitable distribution and access to water for 20% of the population living in climate change risk communities.	National Water Policy	1,919	Unconditional
Resilience for gender and the vulnerable	Implementation of community led adaptation and livelihood diversification for vulnerable groups	National climate change policy	1,023	Unconditional