



DRAFT

**Intended Nationally Determined Contribution
(INDC) of the
Republic of Angola**

November 2015

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EXECUTIVE SUMMARY

The contributions of Angola to this INDC are in the framework of the National Strategy for the Implementation of UNFCCC and the Kyoto Protocol, the Strategy to Fight Poverty (SFP), the National Adaptation Programme of Action (NAPA) and Long Term Strategy for Development of Angola (2025).

Angola is committed to take part in the aspiration set at International level to fight against the phenomenon of climate change, thus contributing to global efforts to reduce greenhouse gas (GHG) emissions. For this, Angola's Intended Nationally Determined Contribution (INDC) encompasses for Mitigation purposes both unconditional and conditional measures for the reduction of GHG. The country is committed to stabilize its emissions, and contribute to climate change mitigation by 2030, targeting the following sectors:

- Power generation from renewable sources; and
- Reforestation.

Angola plans to **reduce GHG emissions up to 35% unconditionally by 2030** as compared to the Business As Usual (BAU) scenario (base year 2005). In addition, it is expected that through a conditional mitigation scenario the country could **reduce an additional 15% below BAU emission levels by 2030**. In achieving its unconditional and conditional targets Angola expects to reduce its emissions trajectory by **nearly 50% below the BAU scenario by 2030** at overall cost of over **14.7 billion USD**.

Given to its extreme vulnerability to Climate Change impacts in some key economic sectors, Angola's INDC also includes priority Adaptation actions that will enable the strengthening of the resilience of the country towards the attainment of the Long Term Strategy for Development of Angola (2025).

Sectoral Intervention for Adaptation

The Angolan economy has been hit hard by the impact of climate change expressed as prolonged drought, damaging flash floods, forest fires, reduced crop production, reduced water resources, impacted fishing resources, etc. Many of the economy sectors of Angola have been impacted by climate variability in the last thirty years. However, there are economy sectors which are extremely vulnerable to impacts resulting from the extreme events and which will pose not only serious livelihood and direct health risks but can also affect the economic potential and national food security. Therefore within the context of this INDC, Angola prioritises the implementation of **Adaptation** measures in the following main sectors:

- Agriculture
- Coastal Zone
- Land-Use, Forests, Ecosystems and Biodiversity
- Water resources
- Health

Angola acknowledges that climate change adaptation requires unconditional as well as conditional actions in order to reduce the vulnerability of communities against the expected Climate Change impacts. The overall cost of implementing both the unconditional and conditional actions amounts to **around 1 billion USD across sectors up to 2030**.

Given the time constraint, this report on the INDC could not be exhaustive, and it is of a dynamic nature and thus will be refined in the light of new data and information.

1. NATIONAL CONTEXT

The Republic of Angola with a size of 1.25m sq km (481,354 sq miles) is located in SW Africa and extremely vulnerable to climate change impacts such as drought and floods particularly in the southern regions. Projections of mean annual rainfall averaged over the country from different models indicate a wide range of changes in precipitation for Angola. Furthermore, IPCC scenarios (SRES A1B scenario as shown in the IPCC 4th Assessment Report) have projected an increase of mean annual temperature in the region by 1.2 to 3.2°C by the 2060s, and 1.7 to 5.1°C by the 2090s. Climate models predict that over the next 50 to 100 years, Angola will experience increased temperatures, more extreme weather events, an expansion of arid and semi-arid regions, seasonal shifts in rainfall, localized floods, increased wildfires, sea level rise, increased rainfall in the northern parts of the country, changes in river flows and changes in sea and lake temperatures. According to the Angolan NAPA (2011), the major expected climate change threats and impacts are: floods, soil erosion, drought episodes, rise in sea-level. The main sectors identified as affected by climate change are: agriculture and food security; forest and biodiversity; fisheries; water resources; human health; infrastructures; coastal zones; energy.

In response to decisions adopted at the 19th and 20th sessions of the Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), as a demonstration of its commitment to take part in the aspiration set at International level to fight against the phenomenon of climate change, thus contributing to global efforts to reduce greenhouse gas (GHG) emissions, Angola has embarked on the process of preparation of its intended determined contributions through a participatory approach. This document therefore presents Angola's Intended Nationally Determined Contribution (INDC) which encompasses for Mitigation purposes both unconditional and conditional measures for the reduction of GHG. Given to its extreme vulnerability to Climate Change impacts in some key economic sectors, Angola's INDC also includes priority Adaptation actions that will enable the strengthening of the resilience of the country towards the attainment of the Long Term Strategy for Development of Angola (2025).

2. ANGOLA'S MITIGATION CONTRIBUTION

Objectives and expected trajectories for 2030

Greenhouse gases covered

The contribution of Angola is based on the estimation of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) for all economic sectors. F-gases emissions are not counted as they were considered negligible across the country.

Sectoral and geographical coverage

Based on the last GHG inventory, the selected sectors are defined according to the revised IPCC Guidelines 1996 and cover the entire territory.

Base year period and baseline data



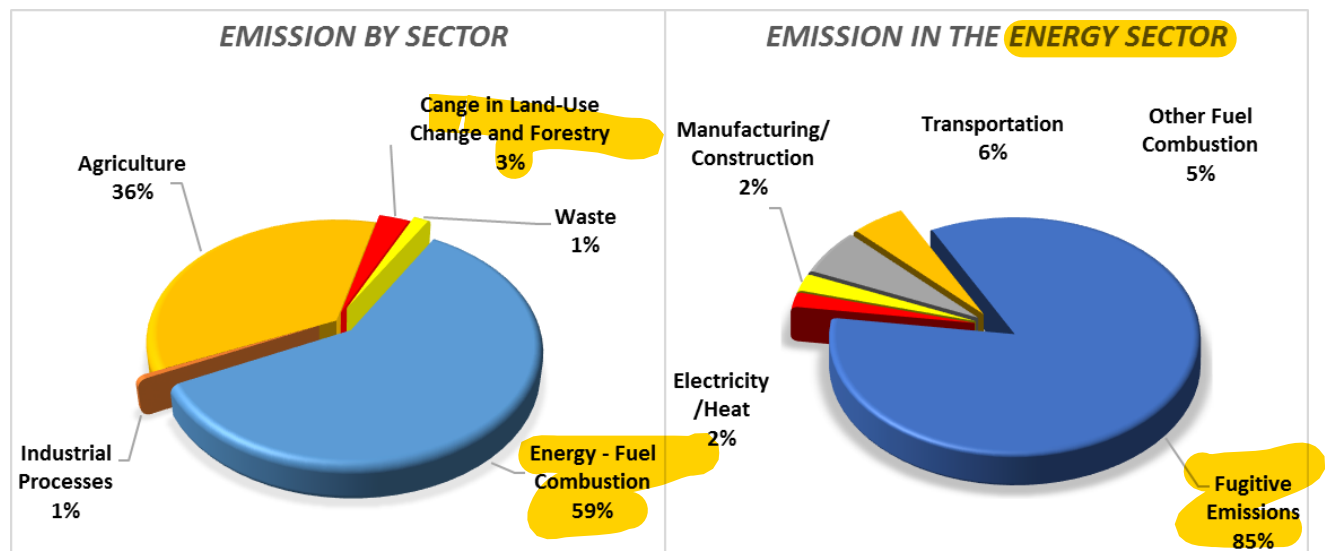
The year 2005 is used as the reference year. Data are extracted from the latest national inventory of greenhouse gases and from the database of ENERDATA¹. The Global Warming Potential (GWP) values used are those determined by the IPCC for the preparation of national emissions inventories according to Decision 4/CMP.7 of the UNFCCC by which from 2013 GWP of CH₄ is 25 and not 21, and PWG of N₂O is 298 and not 310.

¹ENERDATA, 2015





For the year 2005, GHG emissions amounted to 66.8 million tons of CO₂e, of which over 95% stemmed from the fossil fuel consumption. The baseline structure (2005) of GHG emission of Angola by sector shown below indicates the dominance of Energy fuel combustion sector followed by the Agriculture and Change in Land-Use Change and Forestry sectors. In addition, the contribution of the fugitive emissions in the energy sector is clearly evident.



Baseline structure (2005) of GHG emission of Angola by sector and emissions in the energy sector

Reference scenario without mitigation policies

The baseline scenario was developed with the GACMO model (*Greenhouse gas Abatement Cost Model*²) based on linear sectoral projections. It is based on the 2005 inventory of GHG emissions. This inventory was produced according to the revised guidelines of the Intergovernmental Panel on Climate Change (IPCC) and published in the Initial National Communication. The sectoral linear projection estimates the level of GHG emissions without mitigation measures to triple by 2030 from the level of emissions in 2005. More than 90% of these emissions would come from the Energy sector making this the privileged area for the development of mitigation options for Angola.

Contribution level

Therefore, the country is committed to stabilize its emissions by reducing GHG emissions up to 50% below BAU emission levels by 2030 through unconditional and conditional actions targeting the following sectors:

- Power generation from renewable sources; and
- Reforestation.

Unconditional Reduction

The level of reduction planned unconditionally is expected to be up to 35% by 2030 as compared to the Business As Usual (BAU) scenario, taking 2005 as the reference year.

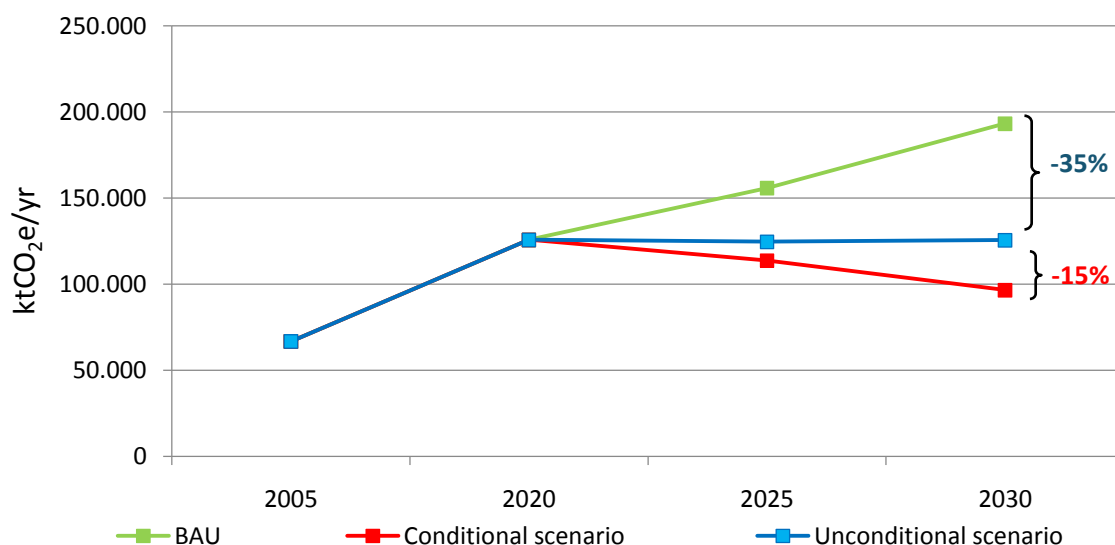
Conditional Reduction

In a conditional mitigation scenario Angola plans to reduce further its emissions. Therefore, the mitigation options identified in this scenario are expected to reduce an additional 15% below BAU emission levels by 2030. In total, in achieving its unconditional and conditional targets Angola

² JoergenFenhann, UNEP DTU Partnership, e-mail jqfe@dtu.dk

expects to reduce its emissions trajectory by nearly 50% below the BAU scenario across sectors by 2030.

Projection of GHG emissions in 2030



Baseline scenario and projections of Unconditional and Conditional mitigation scenarios for Angola

	2005	2020	2025	2030
Emissions – BAU scenario (ktCO ₂ e)		125 778	155 819	193 250
Emissions - Unconditional scenario (ktCO ₂ e)	66812	125 778	124 656 (-20%*)	125 612 (-35%*)
Emissions - Conditional scenario (ktCO ₂ e)		125 778	113748 (-27%*)	96625 (-50%*)

*From the baseline scenario.

These are the absolute emissions (ABS) and the relative reduction (RBU), not the absolute reductions (ABU).

Strategy and planning processes

For metrics and methodologies Global Warming Potential on a 100 year timescale is used in accordance with the IPCC's 4th Assessment Report. The contribution is to be developed into an emissions budget for the period 2021 to 2030.

National strategy and unconditional mitigation options

Unconditional Measures are the ongoing projects which funding has been fully identified and the Government of Angola is expected to implement during this INDC timeframe to accomplish a GHG reduction of at least 35% by 2030 as compared to the Business As Usual (BAU) scenario. The table below indicates sector strategies to achieve the mitigation goals in 2030.

Sectors	Description
Promotion of renewable energy	<p>Even though Angola is an oil-producing country, the potential for renewable energy is significant. With the growing energy demand in Angola, this type of project is seen as priority in the Angolan energy sector strategy. Being an environmentally friendly technology, the renewable-energy projects contribute to sustainable development of the country and will serve as an example for the expansion of this technology locally and nationally. In addition, the production of renewable energy and the dispatching of the entire production to the Angolan electrical system will not only reduce emissions of greenhouse gases (GHGs) but also will mitigate local pollution caused by atmospheric emissions from burning fossil fuel. On the economical perspective, the projects will lead to a reduction on demand from fossil fuels, which are a very expensive item within the national economy. Below are identified some examples of renewable energy projects that are being developed and/or implemented in Angola:</p> <ol style="list-style-type: none"> <p><u>1. Repowering of Cambambe Central I Hydroelectric Power Plant:</u> The Cambambe project activity is located on the Municipality of Cambambe, 180 km east of Luanda, the National Capital. The Municipality of Cambambe is located on the south of the Kwanza Province, which is delimited by the Kwanza River. The proposed project comprises an expansion of the installed capacity to the existing Cambambe Hydroelectric Power Plant, from 180 MW to the current 260 MW. The project activity reduces emissions of greenhouse gases (GHGs) by preventing the operation of power plants that use fossil fuels as an energy source. In the absence of project activity, fossil fuels could be burned in power plants that are connected to the grid. An ex ante estimative of emission reductions achieved by the project is of 1,529,311 tCO₂e per year.</p> <p><u>2. Cambambe Hydroelectric Second Power Plant:</u> The Cambambe project activity is located on the Municipality of Cambambe, 180 km east of Luanda, the National Capital. The proposed project comprises a capacity addition to the existing Cambambe Hydroelectric Power Plant with installation of additional 700 MW of the actual generation capacity. The project activity reduces emissions of greenhouse gases (GHGs) by preventing the operation of power plants that use fossil fuels as an energy source. In the absence of project activity, fossil fuels burned in power plants that are connected to the grid. An ex ante estimative of annual emission reductions is 3,282,000 tCO₂e per year.</p> <p><u>3. Tombwa Wind Farm</u> The Tombwa project activity is located on the Municipality of Tombwa, Namibe Province, 1,234 km east of Luanda, the National Capital. The project activity consists of a wind energy conversion into electrical energy, providing an alternative source of renewable energy. The energy generated will be a result of a total installed capacity of 100 MW and will produce power through 50 wind turbines, with a rated individual potency of 2MW. The wind farm has a main objective of generate electricity to the interconnected national system. This energy will reduce the amount of energy produced by the power plants that runs using fossil fuel, inserting</p>

Sectors	Description
	renewable energy into the system. Thus, helping to reduce emissions of greenhouse gases and encourage the use of alternative energy technologies. Although the ex-ante estimative of emission reductions are low(157,258 tCO₂e per year),the implementation of the project will mean an important contribution to achieve the government efforts to diversify the energy matrix, with the input of another source of clean energy with low environmental impact.
Stabilization of emissions in the agriculture production	Angola's climate diversity allows for the cultivation of a great variety of crops. The national agricultural potential of Angola is high enough that the country has the ability to be self-sufficient. Nevertheless, the sector is characterized mostly by small farmers working under subsistence farming methods. The surface area used for agriculture amounts to about 26% of the territory. GHG emissions in agriculture stem from animal production and wild fires. The objective is to stabilize GHG emissions from these sources . Besides, the country is willing to develop the production of ethanol as an alternative to fossil fuels .
Industrial processes	Angola's annual growth in manufacturing rose from 6.5% in 2012 to 8% in 2013 and was driven particularly by wood, cement, and electric materials production. In 2005 GHG emissions of the industry sector were related to activities such as these: breweries, cement, clinker, pastry, crackers and cookies, margarine, beef, animal feed, glass, freezer assembly, etc. The GHG emissions from Industrial processes are estimated to be very low (less than one million tons of CO ₂ e).
Land Use, Land Use Change and Forestry³	As regards the resource base, natural forest is the most significant biomass resource in the country, comprising an estimated 59 million hectares according to the latest data with current deforestation rates estimated at 0.2% per year. About 53 million hectares of land are considered to be forests – however of those only 2% are actually made up of dense, humid, high productivity forests, that are very rich in biodiversity, 47.1% comprises of a mosaic of forest and savannah, 45.4% is woodland (miombo) and the remaining percentage is occupied by steppe, mangrove and wetlands. Wood logging is essential to the local population, both economically and socially. The potential for wood cutting each year is estimated at 333,000 m ³ and the current rate of cutting is estimated to be 85,000 m ³ per year. The calculation of CO ₂ emissions and removals from land use changes and forestry is primarily based on the following main activities: <ul style="list-style-type: none"> - Forestry conversion; - Use of biomass; - Phase-out of harvested land. The sector is thought to have captured close to 3 million tons of CO₂e in 2005 , and the country is committed to increase carbon sequestration from the forestry sector to 5 million tons of CO₂e per year by 2030 .

Presentation of conditional mitigation options

Key available projects that are expected to maximize the amount of avoided emissions, while concurrently minimizing the level of required upfront investment have been selected as potential mitigation options to be developed conditionally. These mitigation options identified in this scenario are expected to reduce an **additional 15% below BAU emission levels by 2030**. By undertaking

³Personal Communication. Forest Development Institute of Angola (IDF).

these actions Angola will achieve the potential conditional target of 50 % emissions reduction below BAU emission levels by 2030. For this, the Government of Angola will pursue international support to utilize existing and emerging climate finance mechanisms and will encourage investments in green growth development initiatives. These projects are briefly described below and several of them are already on the agenda or subjected to feasibility assessments.

The total funds required for the implementation of these projects are roughly **about 14.7billion USD to reach the mitigation target.**

The power sector:As part of the project“Mapping of the Winds and Solar of Angola” (Implementing Angolan Ministry: Ministry of Energy and Water. National Directorate of Renewable Energy), which aimed at identifying the most suitable sites for the development of endogenous energy resources,a potential of 8,491MW of renewable sources were identified

- 681 MW for wind energy projects,
- 438 MW for solar projects,
- 640 MW for biomass projects, and
- 6,732 MW hydroelectric projects

With an investment of **11,346 million USD.**

Considering that Angola installed generating capacity was 2,388 MW in the first semester of 2015, of which 41.7% is hydroelectric and 58.3% diesel-generated, and that less than 20% of Angola's population has access to electricity, with most depending on wood or charcoal, the objective is to promote access to renewable energy. The table presents the list of renewable energy projects to be considered under a conditional contribution by the Angola to the international climate regime. This projects are in the early stages of feasibility assessment. Developing this portfolio of renewable power projects will stabilize the CO₂ emissions by 2030 from the power sector, as these projects enable to respond to the needs of the increasing demand. Considering an investment of 1,138 US\$/kW for a large-scale hydropower connected to main grid, 4,500US\$/kW for a small-scale hydropower connected to main grid, 1300US\$/kW for wind turbines connected to main grid (on-shore) (GACMO), 3,396US\$/kW for biomass projects and 1,500 US\$/kW for PV solar.

Under evaluation			
3 projects	190	Small scale hydropower	855

Tômbwa, Namibe province	100	Wind power	130
CaculoCabaça Hydropower Project	2,172	Large scale hydropower	2,472
Zenza (1+2)	450 + 120	Large scale hydropower	649
Tumulo do Cacador	450	Large scale hydropower	512
Luime	330	Large scale hydropower	376
Luquixe 2	2	Small scale hydropower	9
Carianga	381	Large scale hydropower	433.6
Bembeze	260	Large scale hydropower	295.9
Salamba	47.9	Large scale hydropower	54.5
Quissonde	120	Large scale hydropower	136.6
Quissuca	121	Large scale hydropower	137.7
Cuteca	203	Large scale hydropower	231.0
Cafula	403	Large scale hydropower	458.7
Dala	360	Large scale hydropower	409.7
Utiundumbo	169	Large scale hydropower	192.3
Capunda	283	Large scale hydropower	322.1
Balalunga	217	Large scale hydropower	247.0
Calindo	58	Large scale hydropower	66.0
Cuvera	62	Large scale hydropower	70.6
Cacombo	29	Large scale hydropower	33.0
Capitongo	41	Large scale hydropower	46,7
Mucundi	73.5	Large scale hydropower	83.7
Calengue	190	Large scale hydropower	216.2
Pampos de Sonhe	37	Wind power	48.1
Quitobia	103	Wind power	133.9
Samba caju	84	Wind power	109.2
Uige	20	Wind power	26
Maquela do Zombo	10	Wind power	13
Capande	23	Wind power	29.9
Hoque	23	Wind power	29.9
Dunga	103	Wind power	133.9
Mombollo	41	Wind power	53.3
Tundavala	23	Wind power	29.9
Quimone	103	Wind power	133.9
Huila	11	Wind power	14.3
Chipindo	6	Solar power plant	9
Lubango	28	Solar power plant	42
Kuito	5	Solar power plant	7.5
CH Gove	5	Solar power plant	7.5
Caála	5	Solar power plant	7.5
WakuKungo II	76	Solar power plant	114
Balém do Dango	20	Solar power plant	30
WakuKungo I	5	Solar power plant	7.5
Lubango II	23	Solar power plant	34.5
Capanda	225	Solar power plant	337,5
CT Luena	4	Solar power plant	6
Lucapa	5	Solar power plant	7.5
CT Dundo	7	Solar power plant	10.5
CH Chicapa	4	Solar power plant	6
CT Ondjiva	2	Solar power plant	3
Camenongue	2	Solar power plant	3
CTG Fútila	14	Solar power plant	21
Leua	2	Solar power plant	3
Luanda	100	Biomass-MSW	533.65
Benguela/lobito/catumbela	20	Biomass-MSW	110.89

Altocatumabela	150	Biomass- wasteforest	371.15
Chinguar	60	Biomass- wasteforest	166.33
Cuima	60	Biomass- wasteforest	166.3
Biocom	40	Biomass – sugar cane	115.74
Lucapa	30	Biomass- wasteforest	95.45
Luená	30	Biomass- wasteforest	95.76
Luachimo	30	Biomass- wasteforest	95.67
Dala	30	Biomass- wasteforest	95.74
Chicapa	30	Biomass- wasteforest	96.56
Lumeje	30	Biomass- wasteforest	95.93
Dinge	30	Biomass- wasteforest	95.41
Total	8,491		11,346

1. The use of biomass as energy source: In Angola about 80% of the population, depend on biomass for their everyday energy purposes, i.e. water heating, cooking and lighting the majority of which are living in rural areas and utilizing biomass as firewood. The demand for wood for charcoal is, therefore, also a significant driver of forest degradation and, subsequently, the release of GHG emissions. Biomass consumption (wood-energy and agricultural residues) remains the main source of domestic energy, and energy in small-scale commercial sectors. This intense cutting of trees to produce and supply charcoal to the urban and periurban areas is putting an extreme pressure on the local resources. Two-thirds of the population in Luanda are living in periurban areas, and approximately 270,000 tons of charcoal are utilized in the capital city annually. Reducing the demand for firewood is, therefore, an important strategy to reduce drivers of deforestation and an exhaustion of Angola's natural resources. Considering that about 1 million tons of charcoal may be used annually in the country, the **potential emission reduction** from the production of charcoal is estimated **at more than 750,000 tCO₂/year and at approximate cost of around 300 million USD**⁴.

2. The agriculture sector: In addition to efforts to mitigate GHG emissions from the agriculture sector, the country intends to **promote the use of biofuels**, by producing ethanol and sugar, using the experience from Brazil. The objective is to cultivate and harvest 34 thousand hectares of sugarcane in the province of Malange, to process a capacity of 2.25 million tons of raw material per season. The country intends to produce 23 million liters of ethanol and 170 GW of power through co-generation by 2019. The budget is **between 540 million and 1 billion USD**.

3. The Forest Carbon Options: Angola possesses significant opportunities for initiating large-scale afforestation/reforestation activities, which hold several economic, social and environmental advantages while alleviating the pressure on natural forests. Afforestation and Reforestation of degraded forest lands and mangrove habitats have a strong potential for mitigation purposes. Angola is currently undertaking legislative reforms in the forestry sector, while FAO is assisting the Government of Angola in carrying out a national forestry assessment with the aim of producing comprehensive information on the state of forests in the country. Several large scale afforestation initiatives are currently being planned which includes 50 000ha to be planted in the 10 years; 140 000ha of eucalyptus to be planted in Huila province; 60 000ha of eucalyptus to be planted in the Province of Kuando-Cubango and 25 000ha about to be planted in Malange province in the next five years. Considering that the current cost of planting 1000 ha = 6 250 000 USD the approximate cost of these afforestation initiatives **will amount around 2 billion USD**.

4. Presently, the potential income from REDD+ projects in the country is considered to be substantial. Calculating the potential emission reductions from REDD+ activities in Angola demonstrates that there is mitigation potential if deforestation is avoided completely. Assuming that

⁴ <http://www.fao.org/docrep/x5555e/x5555e08.htm>

the baseline is entirely based on historical emissions, avoided emissions are calculated by multiplying the annual deforestation in Angola, estimated to be 124,800 ha per year (based on numbers from the period 1990-2010), by 82 tC/ha, which is the approximate amount of tons of carbon stored per ha in the country's forests. **Avoiding deforestation, alone, in Angola has the potential to contribute to more than 35 million tons in CO₂ emission reductions every year. The budget required is above 500 million USD.**

The Republic of Angola recognizes the roll that Carbon Market can play for the mobilization of resources and promotion of the development and transfers of climate friendly technology.

3. ANGOLA'S ADAPTATION CONTRIBUTION

This Adaptation Intended Contribution is included for the purposes of Information of other Parties and the Public that this is part of the country's intended climate actions, and it does not constitute international obligations of the country.

The Angolan economy has been hit hard by the impact of climate change expressed as prolonged drought, damaging flash floods, forest fires, reduced crop production, reduced water resources, impacted fishing resources, etc. Many of the economy sectors of Angola have been impacted by climate variability in the last thirty years, namely the Agriculture, Coastal Zone, Land-Use, Forests, Ecosystems and Biodiversity, Water resources, Health. However, there are economy sectors which are extremely vulnerable to impacts resulting from the extreme events and which will pose not only serious livelihood and direct health risks but can also affect the economic potential and national food security. The need for adaptation seems thus obvious. The vulnerability increases for higher temperature increases, so adaptation needs will depend on the expected temperature rise.

The Republic of Angola ratified the UNFCCC in 2000 and the Kyoto Protocol in 2007. Angola completed its National Adaptation Programme of Action (NAPA) in 2011. In 2012 Angola submitted its Initial National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). Among the priorities identified in the NAPA, two policy measures are noteworthy: revise sectoral laws for proactive adaptation; national institutional mechanism for adaptation planning and mainstreaming. Accordingly, Angola has developed in recent years various national plans and strategies which include activities relevant to climate change, including the:

- *National Strategy for Climate Change* (2008);
- *National Afforestation and Reforestation Strategy* (2010);
- *Strategic Plan of Disaster Risk Management* (2011);
- *National Action Programme to fight Desertification* (2014);

and, above all, the *Strategy of Long-term Development for Angola (2025)*. Many of the actions envisaged in these plans and strategies, particularly in the energy sector, are linked to both adaptation and mitigation.

Objectives and Sectoral Intervention for Adaptation

Within the context of this INDC, Angola prioritises the implementation of Adaptation measures in the following main sectors:

1. Agriculture
2. Coastal Zone
3. Land-Use, Forests, Ecosystems and Biodiversity
4. Water resources
5. Health

Presentation of Unconditional Adaptation options

Angola acknowledges that climate change adaptation requires unconditional as well as conditional actions in order to reduce the vulnerability of communities against the expected Climate Change impacts. The unconditional actions (current) are listed below and its implementation costs amounts **to around 500 million USD at current price.**

Project Title	Description	Sector
Land Rehabilitation and Rangelands Management in Small Holders Agropastoral Production Systems in Southwestern Angola (Project RETESA).	To enhance the capacity of southwestern Angola's smallholder agro-pastoral sector to mitigate the impact of land degradation processes and to rehabilitate degraded lands by mainstreaming SLM technologies into agro-pastoral and agricultural development initiatives.	Land rehabilitation, Agriculture
	Total project cost (US \$ million): 15.397	
	Implementing GEF agency: FAO	
Enhancing climate change resilience in the Benguela current fisheries system (regional project: Angola, Namibia and South Africa)	The project aims to build resilience and reduce vulnerability of the Benguela Current marine fisheries systems to climate change through strengthened adaptive capacity and implementation of participatory and integrated adaptive strategies in order to ensure food and livelihood security.	Fisheries. Agriculture and food security
	Total project cost (US \$ million): 16.520	
	Implementing GEF agency: FAO	
Promoting climate-resilient development and enhanced adaptive capacity to withstand disaster risks in Angola's Cuvelai River Basin	The project is focused on strengthening the capacity of national and sub-national entities to monitor climate change, generate reliable hydro-meteorological information (including forecasts) and to be able to combine this information with other environmental and socio-economic data to improve evidence-based decision-making for early warning and adaptation responses as well as planning.	Early warning systems. Disaster risk management
	Total project cost (US \$ million): 37.179	
	Implementing GEF agency: UNDP	
Integrating climate change into environment and sustainable land management practices	The project will disseminate sustainable land management and adaptation practices in agro-forestry and land ecology in 350 communities.	Agriculture and food security
	Total project cost (US \$ million): 24.831	
	Implementing GEF agency: AfDB	
Addressing urgent coastal adaptation needs and capacity gaps in Angola	Enhancement of coastal adaptive capacities at the institutional, systemic and community levels; response to urgent needs posed by climate change.	Coastal zones/Marine ecosystems
	Total project cost (US \$ million): 17.850	
	Implementing GEF agency: UNEP	
Disaster risk reduction/management to support agropastoral communities affected by recurrent droughts and other natural disasters in southern Angola and northern Namibia (Project PIRAN)	The objective is to strengthen food security and DRR/M, and increase the resilience of agro-pastoral livelihoods by increasing capacity to manage risks related to natural disasters at the level of communities and local institutions. The expected results are: improved agricultural and livestock production, health and animal nutrition, soil and water management and management of early warning systems.	Disaster risk management. Agriculture and food security
	Total project cost (US \$ million): 1.600 (1.180 for Angola) for the first year	
	Implementing GEF agency: FAO Donor: United States of America (USAID/OFDA)	

Project Title	Description	Sector
Integrating Climate Resilience into Agricultural and Agropastoral Production Systems through Soil Fertility Management in Key Productive and Vulnerable Areas Using the Farmers Field School Approach	The project aims to strengthen the climate resilience of the agropastoral production systems in the key vulnerable areas of Angola of the Central Plateau (Bie, Huambo and Malanje). This includes mainstreaming Climate Change Adaptation into agricultural and environmental sector policies, programmes and practices, building capacity and promoting CCA through soil fertility and sustainable land management (SLM) practices by using the Farmers Field School (FFS) approach.	Agriculture and food security. Capacity building
	Total project cost (US \$ million): 32.143	
	Implementing GEF agency: FAO	
Promotion of Sustainable Charcoal in Angola through a Value Chain Approach	To reduce the current unsustainable and GHG-intensive biomass production and utilization from Angola's Miombo woodlands via an integrated suite of interventions in the country's charcoal value chain.	Renewable energy. Forestry
	Total project cost (US \$ million): 17.884	
	Implementing GEF agency: UNDP	
The "Solar Village" Programme	The "Solar Village" Programme, launched by the Executive under the National Development Plan (PND) 2013-2017, allowed to date the electrification of 48 villages in different regions of the country, benefiting 100,000 families. The goal of the Executive is to produce by 2025 about 100 megawatts of solar power to all rural areas, an investment estimated at \$ 150 million.	Renewable energy.
	Total project cost (US \$ million): 150 (to 2025)	
	Implementing Angolan Ministry: Ministry of Energy and Water. National Directorate of Renewable Energy.	
Construction of hydroelectric and thermal power plants	Construction of hydroelectric and thermal power plants (CaculoCabaça, Soyo ...) that will generate about five thousand megawatts, during the period 2013/2017.	Energy
	Implementing Angolan Ministry: Ministry of Energy and Water. National Directorate of Renewable Energy.	
Energy and Water Sector Action Plan 2013-017	A characterisation of the two sub-sectors, including infrastructure and the institutional component, which result in commonalities, e.g. the undersizing and operational inefficiency of the systems, the economic-financial imbalance of public enterprises and a lack of skills.	Energy. Water resources
	Total project cost (US \$ million): 29,170	

Presentation of Conditional Adaptation options

Adaptation options exist in all sectors, but their context for implementation and potential to reduce climate-related risks differ across sectors. Some adaptation responses involve significant co-benefits, synergies and trade-offs). The adaptation projects identified as priorities in the NAPA are listed in the following Table as well as costing to be expected for each of those options. The estimated cost of implementing the NAPA priority projects **amounts to over 500 million USD** if current inflation rates are applied to 2011 costing.

	PROJECT TITLE	PROJECT SECTOR	SECTOR COMPONENT(S)	PROJECT COST (USD)
1	Promote alternative renewable energies to avoid deforestation*	Energy	Renewable energy, Forestry	3,500,000*
2	Promote SLM for increased agricultural yields*	Agriculture and food security	Land rehabilitation, Agriculture	5,000,000
3	Ensure basic access to health services and health monitoring*	Health	Health	3,000,000
4	Study the vulnerability of the fisheries sector to climate change and current modifications*	Coastal zones/Marine ecosystems	Fisheries, Agriculture and food security	2,000,000
5	Extend electricity grid to rural areas*	Energy	Electricity provision	5,000,000
6	Revise sectoral laws for proactive adaptation			2,000,000
7	Create an early warning system for flooding and storms	Early warning system and disaster risk management	Early warning system	3,500,000
8	National institutional mechanism for adaptation planning and mainstreaming			2,000,000
9	Soil erosion control through organic methods	Terrestrial ecosystems		4,000,000
10	Diversify crops to less climate sensitive cultures	Agriculture and food security		3,000,000
11	Technology needs assessment			500,000
12	Locally available adapted seed varieties	Agriculture and food security		5,000,000
13	Climate monitoring and data management system	Early warning system and disaster risk management		17,500,000
14	Study the implication of climate change on disease patterns for humans and livestock	Agriculture and food security	Health	1,500,000
15	Increase water availability through village-level wells and boreholes	Water resources	Water availability and distribution	5,000,000
16	Implement water resources integrated management	Water resources	Water management	3,000,000
17	Map areas of erosion risk	Terrestrial ecosystems		1,000,000
18	Implement water-harvesting system in drought-prone areas	Agriculture and food security	Water resources	3,000,000
19	Improve knowledge of hydrology	Water resources		2,000,000
20	Extend water and sanitation network to rural areas	Water resources	Infrastructure	10,000,000
21	Explore industrial opportunities from climate change			1,000,000
22	Monitor groundwater	Water resources		3,000,000
23	Construct flood protection barriers along major rivers	Water resources	Disaster risk management	5,000,000
24	Study impacts of sedimentation and siltation rates on coastal processes	Coastal zones/marine ecosystems		3,500,000
25	Improve design and construction	Infrastructure		1,000,000

PROJECT TITLE		PROJECT SECTOR	SECTOR COMPONENT(S)	PROJECT COST (USD)
	of buildings			
26	Study impact of climate change on hydroelectricity	Water resources	Energy	1,000,000
27	Revise building codes to promote retreat from flood plains and coastal zones			1,000,000
28	Construct sea level protection structure	Infrastructure	Coastal zones and marine ecosystems	10,000,000
29	Study impact of climate change on mining	Energy		500,000
**Total				107,500,000

* Priority project for which a project profile has been developed

**Not accounting for the inflationary impact of the 2011 costing exercise

4. FAIRNESS AND AMBITION

Angola is extremely vulnerable to the impacts of Climate Change and some specific regions of Angola such as the southern regions are already experiencing a regular worsening of droughts and floods, as well as coastal degradation and regional and national-level adaptation action plans are in place to address those sectors which have been particularly affected. The estimated global warming of 2°C would imply for Angola severe economic losses for Agriculture sector, a sector that contributes to over 8% of the country GDP and at threat to the stability of food security. The Government of Angola has been diverting own funds to carry out implementation of complementary initiatives addressing these Climate Change impacts.

In addition, Angola is the third-largest economy in Sub-Saharan Africa and a net exporter of fossil fuels, and by now the second largest oil producer in sub-Saharan Africa after Nigeria. According to the country's Initial National Communication (INC) report to the United Nations Framework Convention on Climate Change (UNFCCC) released in 2012 (but based on emission inventory statistics from 2005) Angola only contributed approximately with 66.8 million tons of CO₂e of Greenhouse Gas Emissions to the atmosphere. This contribution is meagre and represents a small percentage of current global GHG emissions. However, though showing **an insignificant contribution, at 0.1% of the total global emissions, while the per-capita emissions are 4.15 tons of CO₂e in 2005⁵ compared to the global average⁶**. Angola recognises that in order to meet the 2 degree objective all countries will need to undertake mitigation measures. In fact the Government of Angola has enacted a considerable amount of Laws and Policies as well has developed important sectoral studies which gives an idea of how determined the Government Authorities are to take the country to the forefront of African countries reducing their GHG emissions. Angola's approach focuses on avoiding an increase of emissions per capita beyond the current level, while pursuing its development goals. Through this INDC Angola is determined to reduce its emissions trajectory by **nearly 50% below the BAU scenario by 2030**. In selecting the actions outlined above, Angola has prioritised those which fit with the growth priorities set out in its national development plans in particular the Angola 2025 Policy Document. In addition, Angola has captured the synergies between mitigation and adaptation, not only by prioritising those adaptation activities with significant mitigation co-benefits but also by seeking to minimise the carbon footprint of its adaptation portfolio as a whole. Angola is therefore putting forward Mitigation actions as well as Adaptation measures with mitigation benefits amounting over **15,7 billion USD** that align with a low carbon development pathway, which to be fully implemented would require additional international support in the form of finance, technology transfer and capacity building.

5. MEANS OF IMPLEMENTATION

Angola's contribution will be implemented following the Government strategy set of pursuing the enforcement/execution of the already enacted laws and policies so to reduce the gap between the recent vigorous legislative activity and the real implementation of mitigation measures. Within this framework Angola has already engaged with Clean Development Mechanism by submitting a number of important large scale projects. This action will be complemented by the continuation of climate change mitigation/adaptation mainstreaming into the National Plans and Policies as well as the implementation of the National Strategy for the Implementation of UNFCCC and the Kyoto Protocol. This framework comprises: generating reports and inventories about GHG emissions in

⁵Ministry of Environment. Angola Initial National Communication. (2011) Under the United Nations Framework Convention on Climate Change (UNFCCC). 194 p.

⁶ GHG time series 1990-2012 per capita emissions for world countries http://edgar.jrc.ec.europa.eu/overview.php?v=GHGts_pc1990-2012

Angola and their impact on the environment and public health; producing programmes and projects with measures to mitigate climate change; developing technical and professional training actions in areas related to climate change; fostering international co-operation within the context of climate change, particularly in terms of transfer of knowledge, experience and technology. Therefore, Angola will address the clear shortness of human and technical capacity to keep abreast with the real situation of GHG emissions in the various sectors for which Angola will require support to implement capacity building and training at various level and sectors.

The overall preliminary cost of implementing the proposed Mitigation and Adaptation contributions amount to over **15.7 billion USD across sectors up to 2030**. Some of this amount has already been provided by the Government of Angola within the Unconditional Mitigation and Adaptation scenario. Therefore, the implementation of all the Conditional mitigation and adaptation contributions that the country endeavour to deliver will require international support in form of finance, investment, technology development and transfer, and capacity-building to fully accomplish the intended contributions.

6. SOCIO-ECONOMIC BENEFITS

The accomplishment of the mitigation and adaptation contributions being proposed in the Angolan INDC will undoubtedly bring important benefit for the wider communities and to the rural communities in particular, namely:

- The climate resilience program includes increasing hydropower plants and other renewable energy sources to provide electricity to rural communities and businesses, replacing diesel fuelled off grid generation.
- The implementation of the proposed contribution carries a huge potential of youth job creation in the country either through the local manufacturing/assembly of renewable energy machines/parts or through the forestation and afforestation programmes which demand for labour will be certainly a source of employment for the rural communities.
- The eventual support provided by the international community to Angola will strengthen the technical capacity of the country's human resources through assisted training and capacity building programmes.
- Finally, overall, both the mitigation and the adaptation actions offered as contribution in the Angolan INDC will certainly enhance the adaptive capacity of the rural population and consequently augmenting their resilience to climate change impacts.

7. GENDER PERSPECTIVE

The underlining policies supporting the implementation of the INDC mitigation and adaptation contributions and the actions to be implemented in this context include cross-cutting issues which are gender sensitive and therefore will take into account women as important decision makers regarding energy consumption in particular. Systematically, mitigation and adaptation measures offered in the Angolan INDC emphasize the importance of their implementation avoiding exacerbation of the impacts of climate change that already have disproportionate adverse effects based solely on gender, in particular in the agriculture, water resources and biomass energy sectors.