

**NATIONALLY DETERMINED
CONTRIBUTION OF
ANGOLA**

Republic of Angola

May 2021

ACKNOWLEDGES

The Government of Angola recognizes the country's vulnerability to climate change and is aware of the impacts that the country has been suffering, and the tendency for them to become worse. In this context, Angola wants to be part of the solution, showing its commitment for emissions reduction and adaptation efforts.

The document presented here resulted from the interaction with the different ministerial departments and several Angolan entities, which responded to the challenge launched by the National Directorate of Environment and Climate Action (DNAAC) and participated in bilateral meetings to discuss this NDC, showing a great sense of responsibility and commitment.

This document represents an important step for Angola in its commitment to the Paris Agreement.

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 National Directorate of Traditional Power
 Communities and Institutions
 National Directorate of Structuring and Tourism
 Development
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 Infrastructure and Tourism Products
 National Directorate for the Environment and Climate
 Action
 National Directorate for Prevention and Assessment
 of Environmental Impacts

Ministry of Economy and Planning (MEP)

National Directorate of Studies and Planning
 National Directorate for Economy, Competitiveness
 and Innovation
 Population Policy Office
 Cabinet for Public-Private Partnerships
 National Institute of Statistics

Ministry of Energy and Water (MINEA)

National Directorate of Electric Energy
 National Directorate of Rural and Local Electrification
 National Directorate for Renewable Energies
 National Directorate of Water

National Institute of Water Resources
 Office for the Administration of the Cunene, Kubango
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 Regulatory Institute for the Electricity and Water
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Ministry of Agriculture and Fisheries (MINAGRIP)

National Directorate of Agriculture and Livestock
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 Forest Development Institute
 National Fisheries Research Institute
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Ministry of Industry and Commerce (MINDCOM)

Industrial Licensing Office
 National Directorate of Industry
 Monitoring Department, Environment Promotion and
 Safety in Industry
 Industrial Development Institute of Angola
 Angolan Institute for Standardization and Quality
 National Directorate of Foreign Trade

Ministry of Mineral Resources, Oil and Gas (MIREMPET)

National Directorate of Security, Emergencies and Environment.

Department of Environmental Protection

Ministry of Transports (MINTRANS)

National Institute of Road Transport

Angola Maritime and Port Institute

National Institute of Civil Aviation

National Institute of Railways of Angola

Institute of Hydrography and Maritime Signaling of Angola

National Council of Porters

Ministry of Telecommunications, Information Technologies and Social Communication (MINTTICS)

National Directorate of the Information and Meteorological Society

Angolan Communications Institute

National Centre for Information Technologies

National Institute of Meteorology and Geophysics

Telecommunications Institute

Ministry of Interior (MININT)

National Civil Protection and Fire Service

Office of the Secretary of State for Civil Protection (Office of the Secretary of State for the Interior)

Ministry of Foreign Affairs (MIREX)

Directorate for Multilateral Affairs

Directorate for Legal Affairs, Treaties and Litigation

Office of the Secretary of State for Foreign Affairs

Office of the Secretary of State for Cooperation

SADC Office

Minister of Public Works and Territory Planning (MINOPOT)

National Directorate for Spatial Planning

National Directorate of Urban Infrastructure

National Directorate of Housing

National Institute for Spatial Planning and Urban Development

Geographical and Cadastral Institute of Angola

National Institute of Public Works and Construction

Ministry of Higher Education, Science, Technology and Innovation (MESCTI)

National Directorate of Graduated Training

National Directorate of Advanced Training and Scientific Research

National Directorate for Access, Vocational Guidance and Student Support

National Directorate for Management and Training of Higher Education Staff

Ministry of Finance (MINFIN)

International Studies and Relations Office

National Directorate of State Budget

National Directorate of Public Investments

Ministry of Health (MINSa)

National Directorate of Public Health

National Institute for Health Research

National Institute of Medical Emergencies of Angola

Center for Disease Prevention and Control

Health Research Center of Angola

Ministry of Education (MED)

National Institute for Education Research and Development – INIDE

United Nations Agencies

United Nations Development Program (UNDP)

Photos

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ACRONYMS AND ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business-as-Usual
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COP	Conference of Parties
ENAC	National Strategy for Climate Change 2020-2035 (acronym in Portuguese)
GACMO	Greenhouse Gas Abatement Cost Model
GEF	Global Investment Facility
GDP	Gross Domestic Product
GHG	Greenhouse gas
GWP	Global warming potential
INC	Initial National Communication
iNDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
LDCF	Least Developed Countries Fund
LULUCF	Land use, land use change and forestry
MCTA	Ministry of Culture, Tourism and Environment (acronym in Portuguese)
MINEA	Ministry of Energy and Water (acronym in Portuguese)
MPLA	Popular Movement for the Liberation of Angola (acronym in Portuguese)
MRV	Monitoring, Reporting and Verification
MW	Megawatts
NAPA	National Adaptation Programme of Action
NDC	Nationally Determined Contribution
PA	Paris Agreement
SDG	Sustainable Development Goals
t	Tonne
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States (US) dollar

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EXECUTIVE SUMMARY

Facing climate change is the greatest global environmental challenge in the present. Developing countries are particularly vulnerable to the impacts of climate change because they are highly dependent on natural resources and have limited capacity to respond to these impacts.

At the 21st Conference of the Parties (COP21) in 2015, the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Paris Agreement [45]. This is a historic agreement, the first global legal framework binding the responsibilities of all Parties in joint efforts to combat climate change. The implementation of each Party's responsibilities for climate change response is primarily reflected through the Intended Nationally Determined Contribution (INDC), that Angola submitted in the same year as Paris Agreement was adopted (2015). In August 2020 the Paris Agreement and Doha Amendment Ratification were formally approved by the Government of Angola. In November 2020, Angola ratified the Paris Agreement to UNFCCC.

In accordance with Decision 1/CP.21 of COP21, Parties were requested to communicate or update the NDC by 2020, Angola reviewed and updated its NDC to be submitted to the UNFCCC Secretariat in 2020 based on the actual country context.

Angola is committed to take part in the aspiration set at International level to fight against climate change, thus contributing to global efforts to reduce greenhouse gas (GHG) emissions. For this, Angola's Nationally Determined Contribution (NDC) encompasses for Mitigation and Adaptation purposes both unconditional and conditional measures for the reduction of GHG emissions and adaptation of its territory and population to the adverse impacts of climate change.

An "unconditional contribution" is what Angola could implement without any conditions and based on their own resources and capabilities. A "conditional contribution" is one that Angola would undertake if international means of support are provided, or other conditions are met.

The Business-As-Usual (BAU) scenario considered for this NDC was developed using 2015 as the base year and provides projections for up to 2025. Angola plans to reduce GHG emissions up to 14% by 2025 as compared to the base year (unconditionally). The baseline corresponds to the most recent National GHG Inventory (2015), and accounts for 99.99 million tonnes of CO₂e. The emissions under the BAU scenario are estimated to be 103.9 million tonnes of CO₂e in 2020 and 108.5 million tonnes of CO₂e in 2025.

The mitigation component identifies measures for the period 2020-2025 in the following sectors: Energy (including Transport); Agriculture, Forestry and Other Land Use; Industry; Waste. The adaptation component identifies measures for the period 2020-2025 in the following sectors: Agriculture and Fisheries; Coastal Zone Forests, Ecosystems and Biodiversity; Water Resources; Human Health; Infrastructures.

The adaptation component identifies strategic measures in key sectors in order to improve adaptive capacity, enhance resilience, and reduce risks caused by climate change, thus contributes to the achievement of the country's Sustainable Development Goals (SDGs) and National Development Plan objectives.

The 2020 NDC reflects the feedback from stakeholders and is fully aligned with the development vision of the government. Angola adopted an all-inclusive process of engaging relevant stakeholders through bilateral consultations.

In reviewing the 2015 Intended Nationally Determined Contribution (iNDC), the government organized bilateral meetings, conducted during 2020-2021, in order to identify and discuss relevant measures to achieve the proposed target, responding to the main priorities of the country.

Due to the global pandemic COVID-19 the bilateral meetings were developed through virtual platform.



1.

INTRODUCTION



1. INTRODUCTION

1.1. Overview

At the 21st Conference of the Parties (COP21) in Paris, on 12 December 2015, Parties to the United Nations Framework on Climate Change (UNFCCC) reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future [45]. The Paris Agreement guides developed and developing countries to make individual commitments to transition toward a climate-resilient and low-emissions future.

Parties are required to undertake and communicate efforts to contribute to the achievement of these goals in the form of Nationally Determined Contributions (NDCs) communicated to the UNFCCC (Article 3). All Parties agreed to either communicate their current NDCs or submit new or updated NDCs by 2020, and to do so every five years thereafter. Each successive NDC is expected to represent a progression beyond the current NDC (Article 4) and reflect the Party's highest possible ambition. This upward spiral of ambition underpins the achievement of the goals agreed to in Paris.

The first Intended Nationally Determined Contribution (iNDC) of Angola was submitted to the UNFCCC in 2015. Five years later and following the ratification of the Paris Agreement in November 2020, Angola is submitting an updated NDC, setting targets to contribute to the achievement of the PA goals and meet the country commitments in climate change policy.

1.2. Outline of this document

This document describes Angola's update of its Intended Nationally Determined Contribution for mitigation and adaptation for the period 2020-2025.

It is structured as follows:

- Section 2 describes Angola's national circumstances
- Section 3 presents the NDC Revision Process
- Section 4 describes Angola's contribution to Mitigation
- Section 5 describes Angola's contribution to Adaptation
- Section 6 outlines the means of implementation for the mitigation and adaptation measures contained in the NDC and identifies the barriers to the implementation
- Section 7 describes the fairness and ambition of the present NDC
- Section 8 describes Information to facilitate clarity, transparency and understanding
- Section 9 contains the references

As an annex to this document, a list of indicators for tracking NDC implementation is presented.



2.

CURRENT NATIONAL CONTEXT



2. CURRENT NATIONAL CONTEXT

Angolan vision for Climate Change

“Angola adapted to the impacts of climate change with a low carbon development pathway that contributes to the eradication of poverty.” (ENAC 2020-2035)

2.1. Introduction

The Republic of Angola is vulnerable to the impacts of Climate Change and some territories are already experiencing frequent episodes of extreme weather events of concern such as droughts or floods, as well as coastal degradation.

Concerned with making its contribution to the protection of communities and the rational management of its most varied natural resources, counting on future generations, the Republic of Angola has, in recent decades, become a signatory to several international environmental conventions with the signature of their respective protocols.

Angola ratified the United Nations Climate Change Convention (UNFCCC) in 2000 and the Kyoto Protocol in 2007, reaffirming its commitment to the implementation of measures and programs to stabilize greenhouse gas (GHG) emissions. In May 2000, the country ratified the Montreal Protocol to the Vienna Convention, after being signed by the Parties in July 1998, being one of the most successful United Nations treaties to date with 197 signatory countries.

Angola is also a signatory to the United Nations Convention on Combating Drought and Desertification (UNCCD), the Convention on the Conservation of Wild Migratory Species (CMS), better known as the “Bonn Convention”, the Convention on Biological Diversity (CBD) and the Stockholm Convention on Persistent Organic Pollutants (POPs). Angola is also part of the Law of the Sea Convention.

Most of the conventions continue to deserve their implementation by Angola, through the Ministry of Culture, Tourism and Environment (MCTA), within the scope of the commitments assumed at international level to contribute to the protection of the planet earth and its living beings.

In 2011, Angola completed its National Adaptation Action Plan (PANA) and in 2014 submitted its 1st National Communication to the UN Framework Convention on Climate Change.

In 2015, the country prepared and submitted its Intended National Contribution for the reduction of GHG emissions to the UNFCCC.

Angola recognizes that the country has been greatly affected by the impacts of climate change (prolonged droughts, floods, forest fires, reduced agricultural productivity, reduced water availability, affected fishing resources, ...) and that adaptation is an obvious need. To address these issues, Angola has developed several national plans and strategies, including the National Strategy for Afforestation and Reforestation (2010), Strategic Plan for Disaster Risk Management (2011) and Program of Action National Plan to Combat Desertification (2014). In 2017, the Angolan Ministerial Department responsible for the Environment prepared its National Strategy

for Mitigation and Adaptation to Climate Change 2020-2035, being revised at the moment, which identifies and defines a set of strategic mitigation and adaptation options for different economic sectors.

The Republic of Angola is committed to the full, effective, and transparent implementation of the Paris Agreement in accordance with its provisions and the relevant Decisions of the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP) and the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.

2.2. Geographical Characteristics

Angola, officially the Republic of Angola, is a country located on the south west coast of Africa, whose main territory is limited to the north and northeast by the Democratic Republic of Congo, to the east by Zambia, to the south by Namibia and to the west by the Atlantic Ocean. It also includes the exclave of Cabinda, through which it borders the Republic of Congo to the north. Angola has a surface area of 1.246.700 square kilometers and a coastline of 1.650 square kilometers.

Angola is divided into 18 provinces (Bengo, Benguela, Bié, Cabinda, Cuando Cubango, Cuanza-Norte, Cuanza-Sul, Cunene, Huambo, Huíla, Luanda, Lunda-Norte, Lunda-Sul, Malanje, Moxico, Namibe, Uíge, and Zaire). The most populated province is Luanda which contains its capital city. Its largest province by area is Cuando Cubango located in the south-east at 204,000 km² followed closely by its northern neighbor Moxico at 201,000 km². Cabinda is an exclave that is separated from the rest of Angola by a narrow strip of territory that belongs to the Democratic Republic of the Congo. (Figure 1).



Figure 1 – Angola's geographic location (Adapted from: Natural Earth Data and Angolan Banking Association)

2.3. Climate Profile

Due to its geographical position, the Angolan territory presents an important climatic diversity, resulting from the combination of several factors such as its size, both in the north-south axis and in the coast-inland axis, the diversity of its topography and the effects of the Oceanic Current of Benguela (cold water). In this way, Angola has three major climatic zones. To the north the climate is characterized as hot and humid tropical and as we walk south, the climate becomes drier until it reaches a desert climate in the south-west, on the border with Namibia. The central plateau region has a temperate tropical climate.

There are two different seasons, a hot and humid season, in which rainfall is greater and another cooler and drier. In general, rainfall is higher in the north and inland, increasing with altitude. The Benguela current makes the coastal regions of Angola arid or semi-arid.

2.3.1. Future Climate Projections & Trends in climate variables

The United Nations Intergovernmental Panel on Climate Change (IPCC) has defined four different scenarios, called Representative Concentration Pathways (CPR), which differ in their ability to dissipate heat, ranging from the optimistic (2.6) to the pessimistic (8.5) scenario, through the intermediate scenarios 4.5 and 6.0. The difference between these two intermediate scenarios is when radiation stabilization occurs, respectively, before 2060 or in 2100[8].

Considering RCP4.5 scenario, future projections for Angola indicate an increase in the average annual temperature of 1.2 to 3.2°C in 2060, with warmer and less cold days and nights, a generalized warming of surface waters on the northern and southern frontiers of the large marine ecosystem of the Benguela current, a variation in annual precipitation between -27% and + 20% in 2090, a greater probability of extreme events, such as heat waves, droughts and intense rains. The waterproofing of urban soil will increase the risk of flooding caused by high-intensity point rains [20].

The wind direction is not expected to change, as well as the direction of the sea currents. The pH of rainwater is expected to become more acidic, particularly in urban environments, more as a result of the increase in urban population and pollution of anthropogenic origin and not so much due to climate change. Also, the ocean acidification, the decrease in the pH of the Earth's oceans, is ongoing caused by the uptake of carbon dioxide (CO₂) from the atmosphere.

An increase in the frequency and intensity of flooding in the coastal zone of Angola is expected in all seasons, except in winter months June, July and August, interspersed with longer periods of drought.

The average of sea level is expected to rise, which will have direct consequences for the coastal zone of Angola, not only because that is where the country's population and infrastructure is concentrated, but also because it affects coastal biotopes, such as mangroves, increasing its salinity and making the survival of plant species impossible or altering the local flora.

Table 1 presents a summary of projections by climate variable.

Table 1 - Summary of projections by climate variable [28]

Projection	Condition	Trend
Air temperature	The average global temperature of the earth's surface is likely to exceed, by the end of the 21st century, 1.5 ° C with respect to trademarks registered in the 1850-1900 period.	Increase
Sea water temperature	Positive changes in the temperature of the water in the cold Benguela current may affect outcrop pulses in the planktonic system as a whole. There is shading of effects and causes with the condition of the ichthyofauna and the activities of commercial overfishing in the area, as well as secular variations typical of marine dynamics.	Slight increase or stability in the behaviour of the phenomenon, but with uncertain effects
Sea current temperature	A tropicalization of the equatorial heating zone of the cold Benguela current is expected by 2050. However, the heating of the Benguela current as well as new phenomena such as El Niño de Benguela respond to secular dynamics that cannot yet be statistically separated from each other. possible consequences of global warming.	Stability in the behaviour of the phenomenon, but with sub-dimensioning of data to establish effects arising
Precipitation	A decrease in average annual rainfall in the south and north of the country and an increase in the central coast is expected. In monthly terms, a decrease is expected in the driest months, extending the dry season to the months of April and October. The maximum daily precipitation is expected to increase throughout the territory, this increase being more accentuated in the coastal zone. In the South, precipitation episodes will decrease by the end of the century but will be more intense in the future.	Increase
Sea Level Rise (SLR)	Average sea level increase until the year 2100 between 0.26m and 0.77m considering the 67% confidence interval, between 17% and 84%. Already incorporating an increase in the global average temperature between 1.5 ° C and 2.0 ° C, the increase in sea level would be between 0.35m and 0.93m for the same confidence interval.	Slight increase or stability in the behaviour of the phenomenon, but with uncertain effects
Wind direction	No drastic changes expected. Local phenomena produced by urban corridors may have a specific impact, more linked to the effects of urbanization than global warming.	Slight increase or stability in the behaviour of the phenomenon, but with uncertain effects
Direction of sea currents	No drastic changes planned in terms of direction. Variability can be recorded in terms of vertical adjustments resulting from changes in temperature.	Slight increase or stability in the behaviour of the phenomenon, but with uncertain effects

Projection	Condition	Trend
Rainwater pH due to anthropic action	Expressively linked to the emission into the atmosphere of compounds derived from fossil fuels or possible mining of sulfur compounds in the open.	Increase
Rainwater pH by natural effects	No drastic changes predicted by natural conditions. Anthropogenic action would be primarily responsible.	Slight increase or stability in the behaviour of the phenomenon, but with uncertain effects
Occurrence and intensity of extreme events	<p>Drought: They will tend to increase in frequency and intensity in the coastal area, but with significant consolidation in the central and western regions of the country.</p> <p>Floods: Expected to increase the frequency of floods as well as their intensity, however interspersed with more consolidated periods of drought.</p> <p>Heat waves: Expected to increase the frequency</p> <p>Storm surges: Expected to increase the frequency</p> <p>Wildfires: As global temperatures rise, wildfires are getting more frequent and intense.</p>	Increase
Ocean acidification	The ocean has been playing an important role in helping slow down global climate change by removing the greenhouse gas carbon dioxide (CO ₂) from the atmosphere. However, decades of ocean observations show that the CO ₂ absorbed by the ocean is changing the chemistry of seawater. When seawater absorbs carbon dioxide its acidity is increased.	Increase

2.3.1. Climate Change Impacts

Angola's vulnerability to climate change has been felt over time, with frequent episodes of extreme weather phenomena such as drought or floods, as well as coastal degradation and marked temperature variability in some areas of the country [19], with a special focus on the coast where most of the country's population is concentrated. Policy makers and other relevant stakeholders are increasingly aware of the tendency for them to get worse.

The growing signs of sensitive changes in biophysical systems, whether at regional and/or global scale, highlight the need to identify, analyze and assess the potential impacts of climate change in various socio-economic sectors, in order to plan a concerted response and mobilize adequate resources for its realization.

The main climate change impacts are presented below (Table 2).

Table 2 – Climate change impacts[28]

Climate change impacts
Sea level rise
Increased frequency and intensity of extreme phenomena that cause coastal overtopping and erosion
Change in sea currents circulation
Rising water temperature and increased salinization
Increased soil instability and landslide
Increased susceptibility to desertification and soil erosion
Increased frequency and intensity of extreme precipitation events
Increased frequency and intensity of periods of drought and water scarcity
Increased frequency and intensity of heat waves / heat island effect
Increased frequency and intensity of rural fires
Degradation of assimilation and purification of water courses
Electricity supply instability
Health risks and disease transmission
Change / Loss of biodiversity
Acidification of the sea and fresh water
Intrusion of seawater in coastal areas
Erosion of riverbeds and consequent sediment accumulation in estuaries

2.4. Sociocultural Characteristics

Population

According to the results of the Angolan General Population and Housing Census (RGPH 2014), the country's total population was of 25.789.024 inhabitants (31.127.674 est. in 2020), unevenly distributed in the territory with 63% residing in urban areas and 37% in rural areas[10], and a strong concentration in the province of Luanda of around 6.9 million people.

The country has one of the lowest demographic densities in the world with only 20.6 inhabitants per km² and vast regions with no inhabitants or with less than 5 inhabitants per km², however continues to have one of the highest fertility rates of Africa (registering 5.9 children per woman on average in 2010-2015)[19]. Despite the demographic density is globally low, it is extremely unequal: the urban areas, which are constantly expanding, are contrasted with large sparsely populated areas, particularly in the provinces located along to the coast of the country.

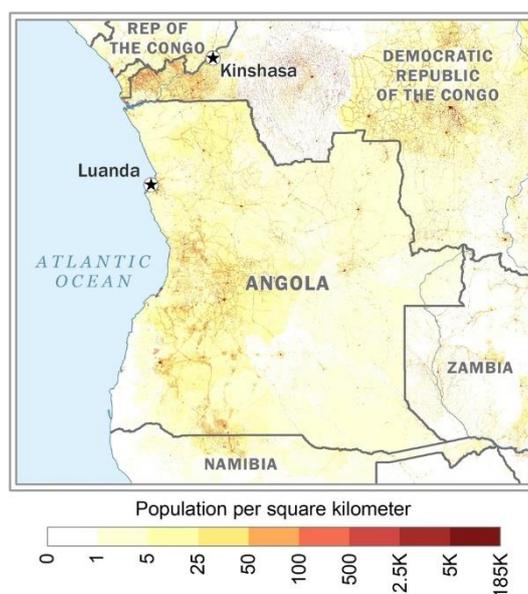


Figure 2 - Population distribution map [48]

The population projections for the period 2014-2050, from the National Institute of Statistics, (based on birth, mortality and migration, using an average natural population growth rate of 3%) predicts that the total population will be more than double from just over 31.1 million in 2020 to 67.9 million in 2050, as presented in the table below (Table 3). Thus, this evolution of the population was considered in the projections of emissions until 2025 and 2030.

Contributing to the population growth tendency is the declining of mortality in the country in recent years as a reflection of the increase of life expectancy at birth, decrease of juvenile mortality rates and lower VIH prevalence in pregnant women (despite existence of some provincial variation)[15].

Table 3 – Estimated population projections for the 2015-2030 period [15]

Population projections 2020-2050 (hab.)							
2015	26 681 590	2020	31 127 674	2025	36 170 961	2030	41 777 194
2016	27 503 526	2021	32 097 671	2026	37 243 484	2035	47.870.396
2017	28 359 634	2022	33 086 278	2027	38 340 130	2040	54.343.997
2018	29 250 009	2023	34 094 077	2028	39 461 732	2045	61.079.991
2019	30 175 553	2024	35 121 734	2029	40 608 969	2050	67.927.825

According to the 2014 Census estimates, the life expectancy at birth of an Angolan is 60.3 years (57.6 years for men and 63 for women), although the country aims to belong to the Human Development Index high score countries (index higher than 0.70) by 2025.

Furthermore, the age structure of the population is very young (average age of 20.6 years), with 65% of the national total population under 24 and only 2% over 65 years old [19].

Education and Literacy

Angola is a multicultural and multilingual country. Portuguese, the only official language, is known by 80% of the population as the primary or secondary language. The six Bantu languages most widely spoken: Umbundu (23%), Kikongo (8.2%), Kimbundu (7.8%), Chokwe (6.5%), Ngangela (3.1%), Kwanyama (2.3%) [48].

In 2020, the Multidimensional Poverty Report of Angola [27] was developed, which considers 4 dimensions: i) Health; ii) Education, iii) Quality of life; iv) Employment - and sixteen indicators that express the different deprivations faced by people living in poverty and are, quite important, to capture the reality of the Country.

According to this report, the incidence rate of multidimensional poverty in the rural area (87.8%) is more than double the incidence rate in the urban area (35.0%).

Angola has, according to UNESCO, an adult literacy rate¹ of 66.03% (a 1.38% decline from 2001). While the male literacy rate is 79.97%, for females is 53.41%, showing a big gap between the sexes.

In Angola, primary education is mandatory and free, which comprises 6 years of schooling (1st grade to 6th grade).

Government

Currently under the 2010 Constitution, the President in office is João Lourenço from the Popular Movement for the Liberation of Angola party (MPLA, in Portuguese), elected when the country held its second Presidential elections in 23rd August 2017 as part of a stable democratic transition.

The country is administratively divided into 18 provinces, each of which is headed by a governor appointed by the central government. Provinces are further divided into councils, communes, circles, neighborhoods, and villages.

The government type is a multiparty democracy with an Executive Presidency composed of the following State bodies: The President of the Republic, the National Assembly, the Government and the Courts². The actual Angolan government is composed by 21 Ministries.

2.5. Socioeconomic Characteristics

Angola has been an independent nation since 11th November 1975, following over 500 years of Portuguese colonization, and has maintained political stability since the end of the 27-year civil war in 2002. In 2010, a constitution established a presidential parliamentary system with the

¹ Adult literacy rate is the percentage of people ages 15 and above who can both read and write with understanding a short simple statement about their everyday life.

² Angola: UN Country Profile

president no longer elected by direct popular vote but instead as the head of the party winning the most seats.

Angola has made substantial economic and political progress since the end of the war in 2002. However, the country continues to face massive development challenges, which include reducing its dependency on oil and diversifying the economy; rebuilding its infrastructure; and improving institutional capacity, governance, public financial management systems, human development indicators, and the living conditions of the population.

The World Bank classifies the world's economies into four income groups — high, upper-middle, lower-middle, and low. The Republic of Angola is a lower-middle income country and is transitioning to be classified as an upper-middle income country.

Faced with the degrading situation of its economy from the civil war, Angola joined the least developed country (LDC) category in 1994[1]. In 2015, the United Nations considered that, given its economic growth, it should no longer be considered as a least developed country [14]. Angola's graduation from the LDC category will be effective in 2021[16]. For the Government of Angola, graduation is an important milestone for the country and its process should be used as a catalyst to accelerate the country's transformation and development agenda [21]. This graduation process is expected to have economic implications.

Poverty reduction is one of the priority objectives of Angolan policy and the actions developed under the Poverty Reduction Strategy, the Integrated Municipal Program for Rural Development and Poverty Reduction and the National Development Plan of 2013-2017 and of 2018-2022, currently in force and under revision, allowed for a positive evolution of national indicators.

According to the National Development Plan of 2018-2022, the poverty rate in Angola fell from 60% to 36% from the beginning of this century to 2018, with almost half of Angola's population rising above the threshold of absolute poverty, with poverty being more prevalent in rural (58%) than in urban areas (19%)[14]. Although the country's wealth concentration indicator is evolving positively, empirical evidence suggests that inequality remains high [22]. In 2018, the GINI index³ for was 51,3%.

The Government has already in place a programme to support vulnerable families. The KWENDA program, which provides for the transfer of a fixed monthly income, in the amount of 8,500 kwanzas, to vulnerable families, as well as their inclusion in income-generating activities, came into force with its approval in the Diário da República.

Despite the positive outcomes, it is essential to strengthen and broaden the scope of policies and measures to reduce poverty, eliminate extreme poverty, promote access to equal opportunities and assure a fairer distribution of wealth and income. Some of the proposed measures in the PDN 2018-2022 are the implementation of a minimum income program for the population with greater economic and social difficulties and a sustainable and fair wage policy and tax system[19]. According to the 2014 Census, 42.2% of the country's population was employed in the primary sector, 26.2% in the tertiary sector and only 6.1% in the secondary sector. In 2018, the unemployment rate was estimated at 28% and remained predominantly high among youth in urban areas (38%)[34]. Is it important to highlight the informal economy, which is constituted as

³ The Gini index measures the extent to which the distribution of income or consumption expenditure among individuals or households within an economy deviates from a perfectly equal distribution. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

a driving force of the organization of economic and social life, and not included in official numbers.

Second largest oil producer in Africa, Angola also has the third largest GDP in sub-Saharan Africa, after Nigeria and South Africa. After a long civil war, the country posted one of the highest economic growth rates in the world, driven by its oil wealth. Angola was then severely affected by the fall in oil prices and by the fall in world demand (notably from China). In 2019, it entered its fourth year of recession, which was extended by the drop in production in mature oil fields; indeed, GDP growth contracted by -1.5% in 2019[35].

Angola is expected to remain in recession in 2020 due to the recent plunge in oil prices and the global slowdown resulting from the impact of COVID-19. Oil sector growth will be highly affected due to the combined effect of supply and demand shocks. Non-oil sector growth is also projected to decline due to spillover effects from lower oil prices, reduced imported capital goods, tighter financing conditions, currency depreciation, and restrictions in the movements of goods and people. The COVID-19 pandemic and the global economic disruptions caused by it put at risk Angola's achievements of macro-economic stabilization and transition to a more sustainable and inclusive growth model [35].

Despite having reached the top of the countries with the highest economic growth, changes in the international economic context following the global financial crisis and recession in 2012 affected funding and economic dynamics nationally, contributing to a significant economic slowdown over the 2013-2016 period. Angola, characterized by its oil industry dependence, suffered the drop-in oil production since 2014 and consequent price decline of this commodity, which resulted in reduced oil exports and affected tax revenues [30]. As a result, the real GDP growth rate decreased from 12.6% in the 2006-2010 period to 4.7% registered in 2011-2015, instigating government cuts in infrastructure spending by 55% between 2014 and 2017.

The reduction in the price of oil and subsequent divestment in the sector over the 2015-2017 period, has strongly impacted oil production nationally causing inflation rates to rise exponentially and fiscal sector indicators to deteriorate, resulting in a contraction of economic activity, public consumption expenditure and public investment, and increasing the public deficit leading to a four year long recession [30].

Since 2016 the real GDP growth rates have been negative (Figure 3). In light of this scenario, in 2016 entered into force a memorandum defining the government strategy to tackle this problem and increase state revenues based mainly on four pillars [17]:

- 1) oil substitution as the main source of revenue,
- 2) short-term export promotion,
- 3) program of public debt payment, and
- 4) a new non-oil dependent economic stability cycle.

Hence, the government of Angola has been taking the necessary actions to help the country overcome the financial crisis, including the constraints in the oil sector, through measures of macroeconomic and financial stabilization, implementation of structural and financial reforms, improvement the business environment, and promoting non-oil sector growth, essential to reduce the high unemployment rate. Nonetheless, regardless of the efforts made in the non-oil sector in the past year - by the end of 2019, non-oil GDP growth estimate was of 0.6% due to the non-oil economy positive performance - the prediction is of continuing economic recession [30]. The government strategy also involves investing in infrastructure, reducing imports through

economic diversification, developing skills and improving the business environment through reducing bureaucracy and easing credit access to companies [19]. Also, the National Development Plan 2018-2022 reinforces the strategic need for the country's development through investment in agriculture and industry.

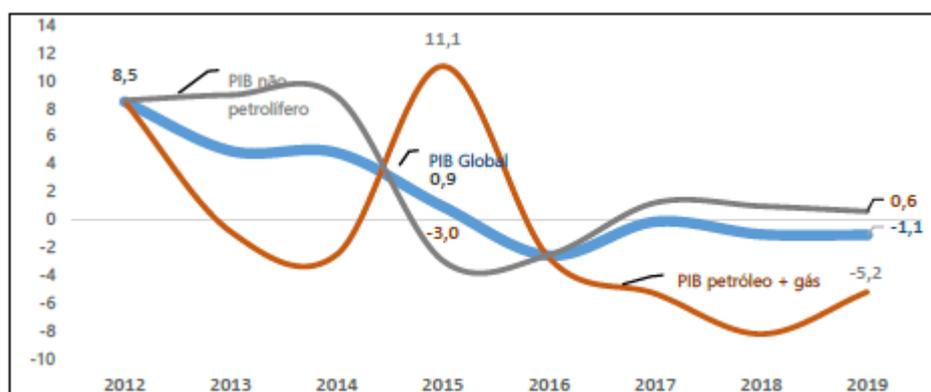


Figure 3 – Evolution of GDP growth rates between 2012 and 2019 [30]

In the 2013-2017 period, the average growth rate of the non-oil sector of 1.2% has been threefold the 0.4% registered for the oil sector [19].

The Government is strongly committed in developing the agricultural sector in order to make the country self-sufficient in basic food supplies, thus reducing imports and increasing exports. Subsistence agriculture remains the main source of income for the majority of the population representing about 47.8% of the total national labour force [19] and a GDP growth rate of 3.8% in 2019 in relation to the previous year [30]. Recently, the Government of Angola developed the Integrated Plan for the Acceleration of Agriculture and Artisanal Fisheries (PIAAPF), stating its plans to mitigate the socio-economic impacts of COVID-19 and dependence on oil, increasing national production by at least 15 to 25%, as well as investments in chains of value [33].

Between 2018 and 2022, projections show that the national economy is expected to have a real average growth rate of 3%, considering the stabilisation of oil production and the acceleration of the non-oil sector. In this scenario, the main drivers of growth are: agriculture with an average rate of 8.9%; fisheries with an average rate of 4.8%; manufacturing with an average rate of 5.9%; construction with an average rate of 3.8%; and services, including tourism with an average rate of 5.9% [19].

2.5.1. Characteristics of the Primary sector

Oil, Mineral & Gas

Producing more than 800,000 barrels per day, Angola is Africa's second largest oil producer, a net producer of natural gas and also the third largest producer of diamonds in the continent, surpassed only by Botswana and the Democratic Republic of Congo. The Angolan economy - the third largest in sub-Saharan Africa - is dominated by the oil and gas industry, which accounts for about 50% of its GDP and is the primary source of revenue for the country (more than 80% of government revenue and 90% of Angola's exports come from oil activities) [47].

Besides oil, Angola has a wide range of valuable natural resources, particularly geological and mineral, including diamonds, iron ore, phosphate, copper, gold and manganese. Some of these resources are still unexplored in vast areas of the territory, reason why the government is implementing the National Geology Plan (PLANAGEO) to promote their exploitation and generate revenues.

The diamond, metallic mineral and other mineral extraction sectors are expected to perform the best in 2019, in consequence of the entry into operation of new diamond mines and of new quarries for the production of ornamental rocks, in addition to the continued production of other gold, iron ore and concentrated iron mines [19], with a growth rate of 17.9%, followed by Energy with 10.7% and the Manufacturing Industry 3.2% [30].

Agriculture and Fisheries

Agriculture

Despite its potential, the agricultural sector is underdeveloped and not very productive, contributing to 9% of GDP but employs 51% of the population. Only about a third of Angola's arable land is used for harvests; of those, only 100,000 out of 5 million arable hectares benefit from machinery and/or animal traction for sowing and harvesting.

Angola's agriculture mainly consists of subsistence farming. The key industrial crops are coffee and cotton. The Government recently heavily invested in coffee, sugarcane and ethanol productions, which should help to diversify agricultural revenues and exports [40].

Fisheries

The fishing sector is third in importance in the country after the oil and diamond industries. The Angolan coastline is 1.650 km long, with two diverging currents (Angola and Benguela currents) that create a strong upwelling system that supports a high primary production of marine resources. However, overfishing and changes in hydroclimatic conditions have strongly reduced the fisheries potential.[49]

The area from Lobito to the mouth of the Cunene River is by far the most productive of Angola's fishing zones, with an abundance of horse mackerel, sardines, tunas and a range of demersal species. Angola's northern fishing zone extends from Luanda to the mouth of the Congo River, and the central fishing zone stretches from Luanda to Benguela.

Artisanal fishing activities are scattered along the coast. Benguela and Luanda provinces have the greatest concentration of artisanal fishing areas. There is a real potential for increased artisanal fisheries and Institute for the Development of Artisanal Fisheries (IPA) has put great effort into developing the sector, particularly in terms of improving quality and tonnage of landings, as well assisting to improve the standard of living of the artisanal communities.[49]

2.5.2. Characteristics of the Secondary Sector

Energy

Angola's current energy matrix, regarding electricity, is fundamentally based on two sources: water and thermal (from oil derivatives) and with regard to energy consumption in rural areas, in biomass (firewood and charcoal). New renewable energies have no expression and represent less than 1% of the energy consumed.

Angola is currently one of the countries in the world with the highest penetration of renewable energies in the electricity sector due to the weight of its hydroelectric plants. In 2013, more than 70% of the electricity produced in the country came from water.[13]

The electricity network of Angola is constituted by 3 main independent systems, based on hydrographic basins, namely, the North, Center and South Systems. The provincial headquarters not covered by these systems are supplied by Isolated Systems. The electricity access rate in Angola is 44% today and most rural areas lack access to electricity and other modern sources of energy.

Combustible firewood continues to be one of the most used forms of energy in rural Angola for heating and cooking. The uncontrolled use of this resource has created some problems of deforestation, although limited to the peripheries of small towns and villages in rural areas. Charcoal, which is mostly used in urban areas, is normally produced unsustainably, since the felled trees are not replaced.[26]

In 2016, the government developed the “Angola Energy 2025”, a document setting the objectives and targets for the electricity sector from 2018 to 2025.

According to this document, electricity supply is expected to increase, with new electricity projects under way and demand growth is expected to reach 7.2 GW by 2025, four times the current value, as a result of the electrification of 60% of the territory. This expansion will guarantee wider access of the population to electric energy and an increase in residential electricity consumption, thus contributing to national wealth growth, services improvement and industrial development [18]. In sum, infrastructure development and incentives to create supply will increase demand and electricity consumption which, in turn, is intrinsically associated with the expected economic development of the country.

2.5.1. Characteristics of the Tertiary Sector

Transports

Road transport

A country's economic and social development cannot be dissociated from the growth of national transport networks that accompany this growth. The growth forecasts for the country in the coming years, both in terms of population growth and the growth of its economy, have implications for emissions in the transport sector.

The roadway network covers about 75,000 km, 7,955 of which are paved. The main axis links the capital with the interior (East to West). At the same time there are a series of branches that connect the main roadways and allow communication with neighboring countries, specifically with Namibia, the Democratic Republic of Congo and the Republic of Congo.

Public passenger transport is underdeveloped in Angola, with the use of individual transport being primarily to the detriment of collective transport. “Candongueiros”, old vans of informal public transport used in Angola, are widely used in the country. At peak times, traffic in urban areas is very intense, and GHG emissions are especially aggravated because a large part of the country's car fleet is made up of old vehicles with old and inefficient engines.

Most of the freight in Angola is transported by road on trucks.

Rail transport

The rail system in Angola consists of around 2.750 km, divided in three main railways that were built eastwards from the coast during colonial times, linking Angola’s key Atlantic ports to the interior. Many of these lines were destroyed during the 27-year-long civil war, but a programme of rehabilitation has been ongoing since 2005.

The three railway lines are:

- Caminhos de Ferro de Luanda (Luanda Railways - CFL): This links Luanda to Malanje in northern central Angola.
- Caminhos de Ferro de Benguela (Benguela Railways - CFB): This links the Port of Lobito and Luau on the eastern border of the Democratic Republic of Congo (RDC).
- Caminhos de Ferro Namibe (Moçâmedes Railways - CFM): This links the port of Namibe to the southern provinces of Cuando Cubango and Hull (town of Menongue) and on to the border of Namibia.

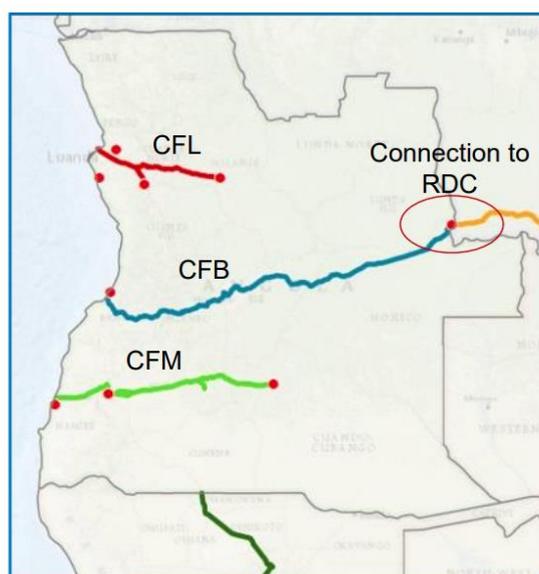


Figure 4 - Rail Transport Angola [29]

Maritime transport

Regarding the maritime transport, Angola's coastline stretches 1,600 kilometers and is served by numerous ports.

The largest ports are Luanda, Lobito, Cabinda, Namibe and Soyo (Figure 5). The port of Cabinda serves the Cabinda enclave region and is heavily tied to offshore petrol operations and handling, as is Soyo. The port of Namibe is the most important fishing port in the country, while Lobito is a historical port that once served as a direct gateway to DRC Katanga region's copper exports (using the Benguela railway) [31].

Also, there is a fluvial network made up of large rivers with several falls, rapids, and lakes, some of which are navigable over dozens of kilometers and also appropriate for bathing and water sports. Some of those rivers are the Kwanza, Zaire, Kuando and Cunene. Angolan rivers offer excellent opportunities for transportation both for Tourism or a mix of Trade and Tourism.



Figure 5 - Location of Angola's main ports [41]

This is Angola's most important foreign trade route. The maritime infrastructure in general is in an acceptable condition, and this has allowed Angola to meet the very heavy traffic needs.

Air transport

Air transport in Angola is mostly aimed at passenger traffic, both international and national. There is a network of airports and airfields distributed over the whole country that allows immediate access to every point in the national territory as well as to other countries from the 4 de Fevereiro International Airport in the capital Luanda which has some of the heaviest air traffic in the whole of Africa. The national airline is TAAG and has routes to Africa, Europe and South America.

Services

The services sector (banking, telecommunications, tourism and hospitality) is also growing rapidly, accounting for 48,7% of GDP and employing 41% of the population.

Tourism is growing, although there is a severe shortage of hotels and other types of accommodation.

The construction sector is booming (9% of GDP), driven by a large reconstruction program launched by the government.

Table 4 - Breakdown of Economic Activity by Sector (2015)⁴

Breakdown of Economic Activity by Sector	Agriculture	Industry ⁵	Services
Employment by Sector (in % of Total Employment)	50,6	8,1	41,7
Value Added (in % of GDP)	8,6	47,9	43,2
Value Added (Annual % Change)	-,76	-3,6	0,3

Because of rounding, the sum of the percentages may be smaller/greater than 100%.

⁴ World Bank latest data (updated October 2020)

⁵ The industry sector consists of mining and quarrying, manufacturing, construction, and public utilities (electricity, gas, and water),

3.

NDC REVISION PROCESS



3. NDC REVISION PROCESS

3.1. Justification & Time Frame of this NDC

Angola is reviewing its NDC following ratification of Paris Agreement in November 2020.

Article 4.10 of the Paris Agreement calls on the first session of the Conference of the Parties serving as the meeting of the Parties to the Agreement (CMA1) to “consider common time frames” for nationally determined contributions (NDCs).

The common time frame is necessary to monitor and review the effectiveness of NDC implementation as well as to aggregate the global number of emission reduction.

Angola is setting the target to achieve a 14% reduction (unconditionally) by 2025.

3.2. Scope and coverage

The NDC scope is fully aligned with the recent National Strategy for Climate Change 2020-2035 (ENAC 2020-2035) and the coverage is nation-wide, and the gases covered include CO₂, CH₄ and N₂O gases.

The mitigation action of this NDC comprises 4 sectors, namely:

- Energy
- AFOLU
- Industry
- Waste

The adaptation action of this NDC comprises 6 sectors, namely:

- Agriculture and Fisheries
- Coastal Zone
- Forest, Ecosystem and Biodiversity
- Water resources
- Human Health
- Infra-structures

3.3. Revision process and NDC Enhancement

The 2020 NDC reflects the feedback from stakeholders and is fully aligned with the development vision of the government. Angola adopted an all-inclusive process of engaging relevant stakeholders through bilateral consultations.

In reviewing the 2015 Intended Nationally Determined Contribution (iNDC), the government organized bilateral meetings, conducted during 2020-2021, in order to identify and discuss

relevant measures to achieve the proposed target, responding to the main priorities of the country.

Due to the global pandemic COVID-19 the bilateral meetings were developed through virtual platform.

Guided discussions with relevant stakeholders focused on three elements:

- **Review of iNDC options:** What is the current status of these projects? What is the planned timing? What are the implementation arrangements and needs?
- **Discussion of additional options:** What other options could be applicable in Angola? What are the key challenges? What are the policy gaps and support needs?
- **Identifying data sources and gaps:** What are the existing information sources? Where are the key data gaps required for detailed analysis?

The Angolan NDC was enhanced by adding measures and actions aimed at strengthening implementation. Also, new information on the most recent National Inventory of CO₂e emissions was added to the document.

3.4. Institutional arrangements

The Ministry of Culture, Tourism and Environment of Angola (MCTA in Portuguese) was the entity responsible for the update of the Angolan NDC, with the support of UNDP Angola.

MCTA currently has 6 National Directorates, namely the (1) National Directorate of Culture and Arts; the (2) National Directorate of Traditional Power Communities and Institutions; the (3) National Directorate of Structuring and Tourism Development; the (4) National Directorate for Qualification of Infrastructure and Tourism Products; (5) National Directorate for the Environment and Climate Action; the (6) National Directorate for Prevention and Assessment of Environmental Impacts.

Under the (5) National Directorate for the Environment and Climate Action, MCTA has the task of formulating, conducting, executing and controlling the policy related to the environment in a perspective of protection, preservation and conservation of environmental quality, pollution control, conservation areas and enhancement of the natural heritage, as well as the preservation and rational use of natural resources.

The National Directorate for the Environment and Climate Action (DNAAC) is responsible for:

- Conceive, propose and implement the national environmental policy and the National Environmental Management Program;
- Guide, coordinate and supervise all the activity of the Ministry in accordance with the law;
- Ensure the correct application of the technical and scientific development policy for the sector's human resources;

- Guarantee the prosecution of laws and other legal instruments.

Its executive services also include the Climate Change Office, responsible for the implementation of the National Climate Change Program (NCCP) and the integration of policies leading to sustainability, GHG emission reduction, offset programs and projects, and the National Directorate for Prevention and Assessment of Environmental Impacts responsible for ensuring the implementation of environmental policy in activities that are likely to cause significant harm to the environment.

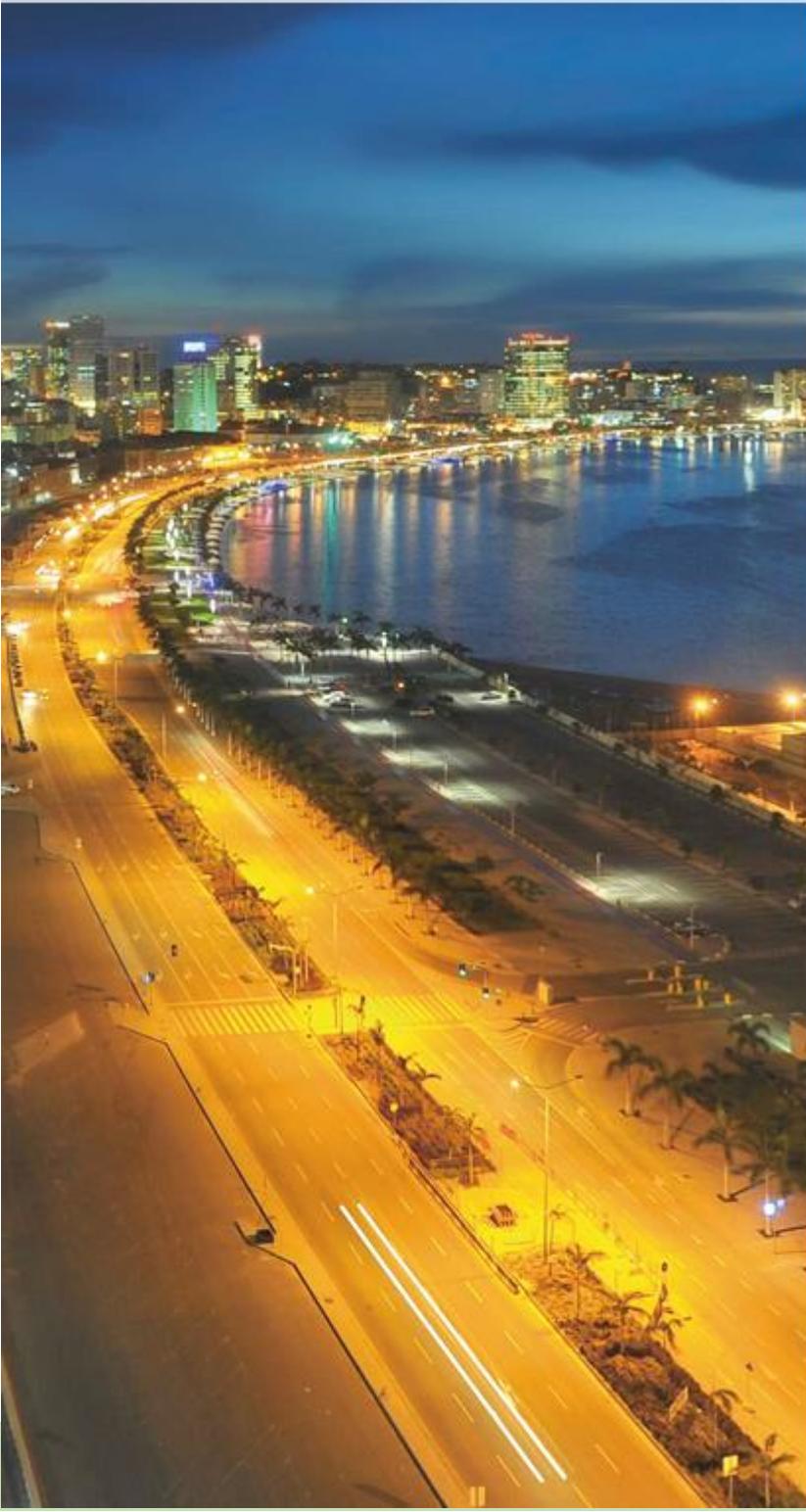
In 2000, Angola created the Multisectoral Commission for the Environment, to deal with climate change issues under the UNFCCC. The Commission has the authority to establish sustainable development measures for various sectors, the implementation of strategies, policies, programs and actions related with environmental protection, as well as to convene agreements between different sectors with regard to environmental management programs.

Also, a National Commission on Biodiversity and Climate Change (CIBAC) was created in 2012 (Presidential Order No. 10/12 of February 1) with the responsibility to create the necessary conditions for the execution and implementation of the National Strategy for Climate Change and for creating a national investment plan for climate change, biodiversity, drought and desertification. The Commission is coordinated by the Ministerial Department responsible for the Environment and integrates several ministries. The Commission has the following duties:

- Agree on the Initiatives and harmonize policies for the implementation of the national strategy on climate change and the strategy for the preservation of biodiversity;
- Create the conditions for the execution and implementation of the national plan for climate change;
- Create a national investment plan that integrates issues related to climate change, biodiversity, drought and desertification;
- Create centres of excellence for research and systematic observation of the climate system.

A successful implementation of this NDC requires a close coordination and collaboration between MCTA and all potential stakeholders including the private sector, civil society and public institutions.

4. MITIGATION



4. MITIGATION

4.1. Overview

IPCC's latest report (2014)⁶ on the impact of global warming underlines the need for ambitious and immediate action to keep the Paris Agreement goals within reach, in particular the 1,5°C temperature goal. The report warns that global mean surface temperature is likely to rise if the current trend on emissions continue.

Through this NDC, Angola presents its ambition and its commitment to contribute to the Paris Agreement objectives. Also, the country is committed to contribute towards achieving the objective of the Convention for the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, as set out in its Article 2.

Angola's mitigation contribution takes the form of a reduction in GHG emissions relative to a business-as-usual (BAU) emissions baseline (2015) over the period 2015-2025.

The contribution comprises of two components:

- **Unconditional contribution:** A reduction of 14% relative to BAU (2015) in the year 2025; equivalent to an estimated mitigation level of 15,4 million tonnes of carbon dioxide equivalent (tCO₂e) in that year. This is an unconditional target, based on domestically supported and implemented mitigation measures and policies.
- **Conditional contribution:** An additional reduction of 10% relative to BAU in the year 2025; equivalent to an estimated mitigation level of 11,1 million tCO₂e in that year. This represents an additional targeted contribution, based on the provision of international support and funding.

The combined unconditional and conditional contribution is therefore a 24% reduction in GHG emissions compared to BAU scenario in 2025; this is equivalent to an estimated mitigation level of up to 26,5 million tCO₂e in 2025.

4.1.1. Source of information

This NDC relies on relevant national and sectorial plans and strategies, namely:

- National Strategy for Climate Change 2020-2035
- National Development Plan for 2018-2022
- Angola Energia 2025 - Long-Term Vision for the Electricity Sector
- Action Plan for the Energy and Water Sector 2013-2017

⁶ 5th Assessment Report: Climate Change 2014

- Atlas and National Strategy for New Renewable Energies
- Strategic Plan for New Environmental Technologies
- Strategic Plan for Urban Waste Management in Angola (PESGRU)
- National Energy Security Policy and Strategy
- Long-term development strategy for Angola (Angola 2025)

For the GHG inventory, the following data sources were considered:

- Consolidated reports of activities in the oil and gas sector

4.1.2. Scope and Coverage

Within the context of this NDC, Angola prioritizes the implementation of mitigation measures in the following main sectors:

- Energy
- AFOLU
- Industry
- Waste

Energy

The energy sector is fundamental to the economic and social development of Angola, allowing to improve the quality and welfare standards of the population.

Renewable electricity generation is on the rise and expected to continue growing, due to private investment and also government strategies and orientation. Renewables like hydro, solar and wind power are perhaps the most widely recognized low-carbon technologies and are likely to be central to a decarbonized power system. One of the challenges of decarbonizing the power sector is sufficiently reducing greenhouse gas (GHG) emissions while guaranteeing reliability, security, and affordability of energy.

Decarbonization is likely to hinge on increased electrification of other sectors. Therefore, the electric power sector may need to grow capacity or increase efficiency as it decarbonizes. This will occur while the sector also changes in other ways, including the development of increasingly complex networks of supply and demand, new demands for bidirectional flow of power, new business models for power generation and grid infrastructure development, and increasing digitization of power technology.

Transport

A country's economic and social development cannot be dissociated from the growth of national transport networks that accompany this growth. The growth forecasts for the country in the coming years, both in terms of population growth and the growth of its economy, have

implications for emissions in the transport sector, resulting in a rise in global temperature and climate change.

Waste

Waste is one of the most complex problems in modern society, with its growth, parallel to economic development, and the difficulties inherent in its management taking on a great political and social importance.

When waste is not properly disposed of in landfills but in landfills or uncontrolled landfills, it becomes a problem for public health and contributes to the pollution of surface and groundwater, making it unfit for consumption.

Industrial development, population growth and high growth rates in cities will continue leading to an increase of waste production in Angola. The Strategic Plan for the Management of Urban Waste (PESGRU) [7], approved in 2012, forms the basis for the definition of a strategy to solve the problem of urban waste management. The development of the waste sector allows not only to minimize environmental and public health impacts, improving the well-being of the population, but also to create valuable jobs and by-products, being a sector with a high economic potential if well managed. Additionally, waste management contributes effectively to mitigating GHG emissions. The use of methane generated in landfills for electricity production is an example of how waste management can have a double benefit: if, on the one hand, waste collection in urban areas contributes to the improvement of the health and hygiene conditions of the populations, on the other hand, the use of biogas generated in landfills contributes to the reduction of GHG emissions and to the security of energy supply, allowing the decentralization of electricity production to consumption areas.

Agriculture, Forestry and Other Land Use

According to the “Guidelines for Defining a Strategy for Exiting the Crisis Derived from the Fall in Oil Prices on the International Market” [17], agriculture will be a key sector for reducing oil dependence and diversifying the economy. The country is endowed with conditions conducive to agricultural and forestry practice, with great production potential all over the territory. Currently, the sector is of significant importance in the country, not only in terms of GDP, 9.9% in 2015, but also in terms of the amount of labour force it employs.

One of the Government's objectives for the agricultural sector is to increase exports and reduce imports, with the aim of making the country self-sufficient regarding basic food products. Thus, and in response to this strategy, the agricultural sector is expected to grow significantly in the coming years, which is why it is important to promote this growth based on the promotion of sustainable practices in agriculture, which allow the sector to grow in a sustainable manner from an economic, environmental and energy point of view.

The capacity of terrestrial ecosystems to capture carbon plays a vital role in reducing the increase of the planet's average temperatures. Forest ecosystems can capture and sequester large quantities of CO₂ through the accumulation of aerial and underground biomass, and the deposit of organic matter accumulated in ground.

Forests are of great socioeconomic importance due to the use of wood as a fuel, building materials, and the use of other resources for food and medicinal purposes. The forest is thus a valuable resource for the country, not only because of the importance it has for the Angolan economy, providing countless socioeconomic and environmental benefits, but also in its fundamental role as a carbon sink and regulator of the balance of ecosystems, and should be explored in a sustainable way.

Forests have a good capacity to recover from natural climatic variations, but the loss of vegetation cover can have consequences in aggravating the impacts of climate change on ecosystems. In this sense, it is for the fundamental Government that some mitigation measures are established for the forest sector that contribute to preserve this country's source of wealth.[20]

Industry

Considering the objective of diversifying the economy that the Angolan Government intends to promote in the coming years, both to respond to the oil crisis and to promote economic diversification in the context of its PMA graduation, the development of other industries in the country. The manufacturing industry, for instance, is expected to develop quite a lot short term. In this sense, the Government recognizes that the growth of economic activity must be sustained by the consumption of energy in a conscious and efficient way.

Direct GHG emissions from industry sector result from diverse processes, including the on-site combustion of fossil fuels for heat and power, non-energy use of fossil fuels, and chemical processes used in cement production, for example. In addition, industry generates indirect emissions from the centrally generated electricity it consumes. With the objective of promoting a more sustainable national industry from an energy and environmental point of view, the Government intends to encourage the replacement of diesel generators by natural gas cogeneration systems with the capacity to produce energy and heat, out of other measures.

From the point of view of security of energy supply, the production of electricity for self-consumption from cogeneration systems guarantees the supply of electricity in a reliable manner, avoiding power outages and the instability of the Angolan electrical networks, avoiding any damage that these may cause the machinery, in addition to the advantage of using an endogenous and abundant fuel that is produced in the country. In addition, cogeneration systems allow the heat generated in the combustion of natural gas to be used in the industrial process itself, increasing the efficiency of energy use. From an environmental point of view, replacing the use of diesel with natural gas in industry is a measure that will contribute to the reduction of GHG emissions.[20]

4.2. Reference point: National GHG Inventory

4.2.1. Methodology

The base year considered in this NDC is 2015, Angola's latest GHG inventory data that was concluded in November 2020. Total greenhouse gas emissions in Angola is 99.992 ktCO₂e, which represents 3.74 tCO₂e per capita [38].

The GHG Inventory follows the 2006 IPCC Guidelines on National Greenhouse Gas Inventories and emissions include CO₂, CH₄ and N₂O and the Global Warming Potential (GWP) values used are those determined by the IPCC for the IPCC Second Assessment Report.

The most recent inventory considers the updated data in order to remain minimally consistent with the material of the 1st national inventory of Angola (2000 and 2005). The 1st inventory was prepared following the guidelines provided for in the IPCC Guide 1996. However, to apply the IPCC Guide 2006 it is necessary to carry out a contextualization, as the methods are substantially different. To conduct their inventories, countries use various methods to obtain data, including annual inventory, ten-year forest inventories, periodic surveys and remote sensing. Each of these data collection methods produces different types of information (for example, maps or tabs), at different reporting frequencies and with different attributes, which made it possible to calculate emissions for the sector.

Table 5 - Global Warming Potential

Gases	GWP
CO ₂	1
CH ₄	21
N ₂ O	310

GHG emissions were calculated using the activity data for each source and their respective emission factor, according to the following formula:

$$\text{Emissions} = \text{Activity Data} \times \text{Emission Factor}$$

Since Angola does not have specific emission factors (own) until the present moment, for the elaboration of the GHG inventory, the emission factors by default of the 2006 IPCC Guides were used.

Energy

For this sector, greenhouse gas emissions were inventoried from the adoption of the Bottom-up methodology (or sectoral approach), in which those emissions are calculated from the final energy consumption. The sectoral approach made it possible to identify where and how emissions occur.

CO₂ emissions are dependent on the carbon content of fuels and can be estimated at a high level of aggregation and with reasonable precision. For non-CO₂ gases, the IPCC default values were used. In addition to CO₂, CH₄ and N₂O gases are estimated.

For the calculation of national greenhouse gas emissions in the energy sector, the Level - 1 calculation method was used. The survey of the information required for the calculation was carried out through consolidated reports of activities in the oil and gas. GHG emissions are calculated by knowing the activity data (fuel consumption or burning) for each source and its respective emission factor.

Table 6 - Energy GHG Sources

Sector	Category	Sub-category	Description
Energy	Fuel use activities	Energy industries	Electricity generation
		Transport	Civil aviation, rail, sea and road transport
	Fugitive fuel emissions	Oil and Natural Gas	Natural gas
		Residential	Oil
		Oil and Natural Gas	Flaring
	Emissions from the consumption of firewood and charcoal	Residential	Venting (atmospheric discharge)
			Cooking
Emissions in the charcoal	Energy Industries	Charcoal Production	

Waste

The Waste sector includes CH₄, CO₂ and N₂O emissions resulting from the final disposal and incineration of solid waste and wastewater treatment in the Republic of Angola, based on the application of the 2006 Guidelines of the Intergovernmental Panel on Climate Change.

The calculations related to emissions from the disposal of solid urban waste were made, considering primarily national data and when not available, default data from the IPCC was used.

The parameters used for the calculation were: population, degradable organic carbon, gravimetric composition of the residues, rate of generation of residues per inhabitant, oxidation factor, methane recovery and IPCC default data.

Table 7 - Waste GHG Sources

Sector	Category	Sub-category	Description
Residues e effluents	Disposal of solid waste	Waste disposal in unmanaged sites	Dumpsters
		Waste disposal in managed sites	Landfills
	Incineration and open burning of waste	Waste incineration	Waste incineration
	Treatment and disposal of industrial effluents	Treatment and disposal of domestic effluents	Treatment and disposal of domestic effluents
		Treatment and disposal of industrial effluents	Treatment and disposal of industrial effluents

Agriculture & Livestock

In the agricultural sector, the main greenhouse gases of interest are CO₂, N₂O and CH₄. The Agricultural Division includes all emissions related to enteric fermentation, handling of animal manure, rice cultivation, burning of agricultural residues, agricultural soils, and liming.

The subcategory Greenhouse Gas Emissions from burning biomass in agricultural crops referring to the category Aggregate sources and sources of non-CO₂ gases on land were not included in the Emission Inventory by sources and removal by sinks of Greenhouse Gases (GHG) Angola, given the low representativeness of these activities in the territory.

Industry

The industrial sector in Angola represents about 8% of the gross domestic product generated estimated at around US \$ 100 billion in 2019. The main industries in the territory are the processing of oilseeds, cereals, meat, cotton, and tobacco. Also noteworthy is the production of sugar, beer, cement, and wood, in addition to oil refining. Among the industries, tires, fertilizers, cellulose, glass, and steel stand out.

The industrial sector is responsible for a considerable part of CO₂ emissions, from burning fossil fuels, for example, in the production of cement, which are treated in the Energy sector.

However, there are other sources of greenhouse gas emissions from the industrial sector. The table below shows which are the relevant subsectors considered for this sector.

Table 8 – Industry GHG Sources

Sector	Sub-sector	Category	Description
Industrial processes and product use (IPPU)	Mineral industry	Cement production	Cement production
		Lime Production	Production of Dolomitic limestone and virgin lime
		Glass Production	Glass Production
		Ceramics Production	Bricks and Tiles Production
	Metal industries	Production of Iron and Steel Alloys	Production of Iron and Steel Alloys

Forestry and Other Land Use

The inventory also contains information on forests, land use and land use change. In terms of classification, area and sampling data that represent various categories of land use are needed to estimate carbon stocks, the emission and removal of greenhouse gases associated with the activities in which the IPCC 2006 guidelines summarize how the Agriculture, Forestry and Other Land Use (AFOLU) sector. The classification presented formed the basis for estimating emissions and removals of greenhouse gases on the use of different types of data to represent land use categories and conversions between land use categories, so that they could be applied more appropriately. and consistent as possible in inventory calculations.

The IPCC classification addresses land use in conjunction with agricultural activities. Such an economic activity must present its inventory calculations separately, as well as the Agriculture sector and not as a component sub-sector of the forest and land use sector.

4.2.2. GHG Emissions by sector

Total GHG emissions for the year 2015 accounted for 99.992 ktCO₂e.

Table 9 shows an emissions breakdown – total greenhouse gases, plus carbon dioxide, methane, and nitrous oxide individually – by sector.

Table 9 - Emissions breakdown by sector

GHG emissions source (2015)	ktCO ₂ e emissions	
	Total	%
Energy	18.115,62	18%
Agriculture & Livestock	6.544,911	7%
Waste	3.151,339	3%
Industrial Processes	1.819,919	2%
Land Use and Land Use Change	70.360,442	70%
Total	99.992,231	100%

GHG Emissions

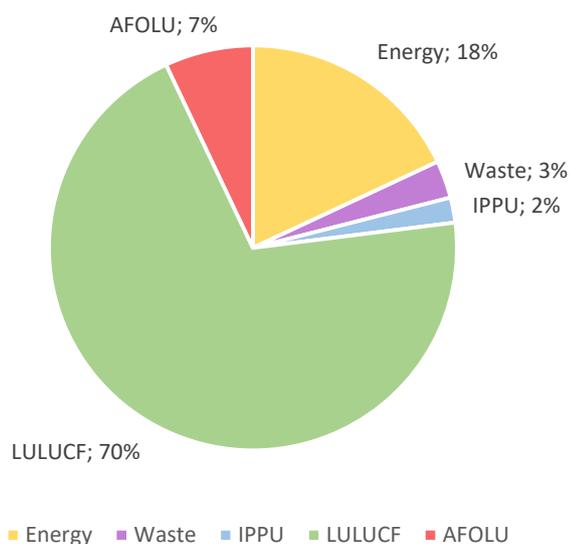


Figure 6 – Greenhouse gas emission by sector

Per capita greenhouse gas emissions are measured in tons of carbon-dioxide equivalents (CO₂e) per person per year. This metric converts all greenhouse gases to CO₂e based on their global warming potential value over a 100-year timescale⁷.

Table 10 - Emissions breakdown per capita by sector

GHG emissions source (2015) per capita	tCO ₂ e emissions	
	Total	%
Energy	0,68	18%
Agriculture & Livestock	0,25	7%
Waste	0,12	3%
Industrial Processes	0,07	2%
Land Use and Land Use Change	2,64	70%
Total	3,75	100%

⁷ The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO₂). The larger the GWP, the more that a given gas warms the Earth compared to CO₂ over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases.

In this chart we show how the average person’s emissions would be distributed across the different sectors – in effect, this shows the average ‘footprint’, measured in tonnes of carbon dioxide equivalents per year.

Per capita emissions were calculated using the population for the year 2015 (26.681.590 inhab).

4.3. Business-as-Usual (BAU) scenario

The BAU refers to a scenario that assumes that no mitigation policies or measures will be implemented further than those that are already in force and/or are legislated or planned to be adopted, i.e., the level of emissions that would take place without further policy effort.

Projections were calculated using GACMO - The Greenhouse Gas Abatement Cost Model (GACMO), developed by UNEP DTU Partnership. The BAU scenario was constructed based on the national GHG Inventory of 2015, according to the IPCC guidelines.

The mitigation measures were selected and prioritized based on consultation with stakeholders, which formed the basis for the calculation of the mitigation scenario, calculated using the GACMO model.

According to BAU projections, and with no considerations for mitigation measures in the country, the GHG emissions in Angola are expected to keep rising for the next decade (Figure 7).

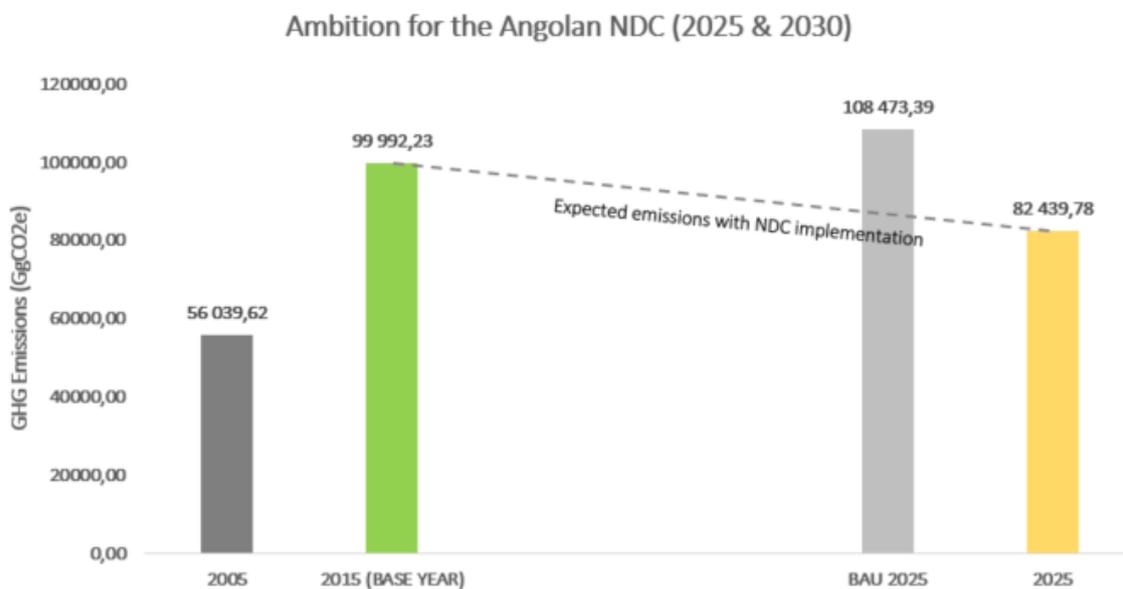


Figure 7 – Ambition for the Angolan NDC

4.4. Mitigation Contribution

In this NDC update, Angola sets the target of achieving those 15% of emission reduction by 2025, **unconditionally**. In addition, it is expected that through a conditional mitigation scenario the country could reduce an additional 10% below BAU emission levels by 2025.

To achieve that, several measures were identified and analyzed, being selected for Unconditional (Table 11) and Conditional Contribution (Table 12).

Additionally, in annex 9.2, measures to achieve Angola set of targets by 2030 are presented. Unconditionally, the target it is to achieve a 21% emission reduction by 2030, equivalent to an estimated mitigation level of 23,3 million tCO₂e in that year. In addition, it is expected that through a conditional mitigation scenario the country could reduce an additional 15% below BAU emission levels by 2030, equivalent to an estimated mitigation level of 39,7 million tCO₂e in that year.

Unconditional contributions

Table 11 – Unconditional Mitigation Contributions

Sector	Area	Unconditional Contributions	ktCO ₂ e reduction potential	% contribution for target	Cost (Million USD) ⁸
Energy	Renewable Energy	Installation of biomass plants – 500 MW	2 102,00	13,34%	1 698
		Installation of mini-hydro – 100 MW	194,20	1,26%	450
		Installation of hydroelectric power stations – 700 MW	3 247,67	20,62%	797
		Installation of large-scale solar power plants (PV) – 104 MW	159,58	1,23%	156
		Installation of small-scale solar panels (PV) (solar villages) – 100 MW	138,10	0,88%	646
		Installation of small-scale solar panels in the industry – 2 MW	2,76	< 0,1%	13
		Installation of wind farms – 100 MW	154,71	0,98%	130
Waste	Municipal Waste	Composting of municipal solid waste – 500 ton/day	2 068,39	13,13%	7
Agriculture, Forestry and Other Land Use	Forest	Reforestation – 227 000 ha	1 015,67	6,45%	416
Industry	Fugitive Emissions	Reduce flaring – 295 MMSCF/day	6 670,98	42,35%	29 500
TOTAL			15 754, 1	100%	32 313,00

⁸ The budget figures presented correspond to estimates based on a benchmark exercise with similar actions developed in comparable countries. The implementation of the measures presented requires the determination of a real budget.

Assumptions

For the measures relating to renewable energy, biomass, mini hydro, and wind power, it was considered what was identified at ENAC, which is in line with what is stated in the Angola Energy 2025 strategy, corresponding to the installation of 800 mw of renewable energy by 2025, where 500 MW was considered for biomass, 100 MW for mini hydro and 100 MW for wind. In terms, of hydro and solar power potential projects were considered from projects that were already identified in the Renewable Energy Atlas of Angola.

The hydroelectric capacity proposed to be installed in this scenario considers the Cambambe 2 project.

The proposal for solar energy considers the Waku Kungo II and Lubango project.

For reforestation, 50% of what was proposed for reduction in the INDC by 2030 (target 2030: 2032 ktCO₂and sequestration) was considered.

For the reduction of flaring, the information from the World Bank⁹ was used, which said in 2011 that Angola aimed to reduce flaring by 75%. In this scenario half of this reduction target was considered, compared to the value of flaring in 2015 (reported in the National Inventory).

For the solar villages it was considered as an assumption what was present in the PND 2013-2017, where the objective was the installation of 100 MW of solar PV in solar villages by 2025.

For solar panels in industry a value of 2 MW was proposed, since ENAC did not make assumptions associated with this measure.

Finally, composting, the capacity to send 500 ton/day of waste for composting was considered.

⁹ Angola's Major Natural Gas Project to Cut Emissions from Flaring. <https://www.worldbank.org/en/news/feature/2013/09/20/angola-major-natural-gas-project-to-cut-emissions-from-flaring>

Conditional contributions

Table 12 – Conditional Mitigation Contributions

Sector	Area	Unconditional Contributions	ktCO ₂ e reduction potential	% contribution for target	Cost (Million USD) ¹⁰
Energy	Renewable Energy	Installation of biomass plants – 500 MW	2 102	7,92%	1698
		Installation of mini-hydro – 150 MW	291,30	1,07%	675
		Installation of hydroelectric power stations – 2 050 MW	9 511,05	35,83%	2 333
		Installation of large-scale solar power plants (PV) – 104 MW	159,58	0,60%	156
		Installation of small-scale solar panels (solar villages) – 187 MW	258,25	0,97%	1 209
		Installation of small-scale solar panels in the industry – 2 MW	5,52	< 0,1%	26
		Installation of small-scale solar panels (NAMA Program) – 15 MW	20,88	< 0,1%	96,9
		Installation of solar lamps on the streets – 2000 lamps	1,55	< 0,1%	3
		Installation of wind farms – 100 MW	154,71	0,58%	130
	Energy Efficiency	Installation of efficient LED lamps in public buildings – 2000 lamps	0,31	< 0,1%	0,016
		Installation of efficient LED lamps in public lighting – 2000 lamps	1,36	< 0,1%	2
Road Transport	Natural gas buses – 2000 buses	6,59	< 0,1%	3	
Waste	Waste	Composting of municipal solid waste – 1 000 ton/day	4 136,78	15,58%	8,1
Agriculture, Forestry and Other Land Use	Forest	Reforestation – 416 000 ha	1 525,33	5,75%	624
Industry	Fugitive	Reduce flaring – 370 MMSCF/day	8 366,99	31,52%	37 000
TOTAL			26 542,2	100%	43 963, 23

¹⁰ The budget figures presented correspond to estimates based on a benchmark exercise with similar actions developed in comparable countries. The implementation of the measures presented requires the determination of a real budget.

Assumptions

In this scenario, 4 additional measures were considered compared to the previous one. For Biomass, solar and wind were considered the same projects and also the same installed capacity. Two measures about efficient lamps, one for solar luminaries in streets and one for natural gas buses, also proposed at ENAC, but without assumptions. It was considered the implementation of 2000 units for each of these four measures.

Hydroelectric power was considered a potential project, some of the projects already identified in the Renewable Energy Atlas of Angola (2199 MW). In addition to Cambambe 2 already considered in the unconditional scenario, three more projects were added: Luime, Túmulo do Caçador and Zenza (1+2).

The program called NAMA (Nationally Appropriate Mitigation Actions), brought the opportunity for the implementation of 15 MW to replace the use of diesel in three commercial farms in Angola was considered in this scenario as a small-scale solar panel.

For the Mini-hydro, 150 MW were considered, coming from 3 projects identified in the Renewable Energy Atlas of Angola.

For solar villages and solar panels in industry, the value used in the unconditional 2025 scenario was doubled in this scenario.

In the flaring reduction, 75% of the target considered in the unconditional scenario was considered.



5.

ADAPTATION



5. ADAPTATION

5.1. Overview

The Paris Agreement states that one of its aims is to increase “the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development” (Article 2). It also established the global goal of “enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change” (Article 7).

In this context, Angola recognizes the importance of adaptation in strengthening domestic resilience to the impacts of climate change and has decided to include adaptation in the NDC. In addition to outlining conditional and unconditional mitigation contributions and the NDC will contribute to the global target of adaptation, reducing vulnerability, strengthening resilience and increasing the country's adaptive capacity in order to protect ecosystems, people, livelihoods and strategic sustainable development and economic investment, taking into account the urgent and immediate needs of the country, based on the best science available and national context.

While inclusion of adaptation in the NDC is voluntary, countries are encouraged by the Paris Agreement (Article 7) to submit an adaptation communication to report on adaptation. The present chapter – Adaptation Contribution – serves as this adaptation communication for Angola.

The process involved an extensive review of relevant documents on climate adaptation that have been developed over time starting with the National Strategy for Climate Change 2020-2035 and the associated sectors working papers.

5.1.1. Source of information

The main document considered for this NDC update was the National Strategy for Climate Change 2020-2035, which was developed after a long process of consultation with stakeholders and of document review, namely:

- National Adaptation Programme of Action (NAPA), 2011
- National Development Plan 2018-2022;
- Long-Term Development Strategy for Angola 2025;
- National Health Development Plan 2012-2025;
- Medium-Term Development Plan for the Agrarian Sector 2018-2022;
- National Action Program to Combat Desertification; National Development Plan (PDN) 2018-2022;
- Disaster Preparedness, Contingency, Response and Recovery Plan for the period 2014-2019;
- Strategic Plan for Disaster Risk Prevention and Reduction;
- Fisheries and Aquaculture Management Plan for the period 2018-2022

Recently, in 2019, Angola elaborated its Climate Change Adaptation Plan for the Coastal Zone, identifying the main vulnerabilities of this area to the impacts of climate change, as well as several adaptation measures to adapt the territory to those expected impacts. This plan is an outcome

of the National Strategy for Climate Change, as it is one of the adaptation measures proposed for the Coastal Zone sector

5.1.1. Scope and Coverage

Within the context of this NDC, Angola prioritizes the implementation of adaptation measures in the following main sectors:

- Agriculture and Fisheries
- Coastal Zone
- Forest, Ecosystem and Biodiversity
- Water resources
- Human Health
- Infra-structures

Agriculture and Fisheries

Climate change requires farmers to adapt to new agronomic practices such as conservation agriculture, growing of drought tolerant crops, precision agriculture (which in turn also requires a better access to input for seeds and fertilizers) and agro-forestry amongst others in order to improve productivity.

Climate change translated by the generalized heating of surface waters on the northern and southern borders of the front of the Benguela current and cooling on the western and southern coasts of South Africa could alter the distribution and stocks of fish off the coast of Angola.

Angola has a great potential for fishing capacity, particularly along its coastline due to the resources it contains, which is relevant to the universe of flora and fauna in the country.

The impacts of climate change in Angola are likely to be strongly felt in fisheries: according to the conclusions of the fifth IPCC evaluation report, Angola is among the most vulnerable countries in terms of the impact of the climate on their fisheries. By 2050 the value of fisheries in West Africa, including Angola, is expected to decrease 21%, resulting in a loss of \$ 311 million in revenue from this economic activity.

The level increase and the increase in water temperature will also have an impact on the major currents of the Angolan seacoast (Benguela and Gulf of Guinea), with subsequent changes in the levels of salinity and existing marine ecosystems. Rivers may also be affected by an increase in the level of salinity in the estuaries. As a result, fishing carried out along the coastal zone and rivers will be severely affected. Mindful of the challenge of climate change on marine resources, in the Strategic Action Plan of the Benguela Current Convention, Angola, Namibia and South Africa seek to introduce an ecosystem approach to fisheries management.

For the 2018-2022 period, the Government advocated as general objectives of the sector the promotion of competitiveness and the development of industrial and artisanal fisheries in a sustainable way, also providing for the improvement of infrastructures and the development of aquaculture. In this context, the African Development Bank, in partnership with FAO, approved

in 2013 a project to support the development of artisanal fisheries in Angola, which should start in 2019. At the same time, the creation of support centers for artisanal fisheries was recently announced with a view to supporting fishing activities by local communities, in particular, seeking to improve the income of fishing communities, increasing revenues, managing marine resources and maritime safety. The first support center is under construction since January 2017 in the Salinas community, on the coast of the city of Sumbe (Cuanza Sul).

In these circumstances, it is essential to give due continuity to the activities carried out in the context of the enhancement of marine resources in order to ensure the sustainable development and resilience of the Angolan fishing sector.

Coastal Zone

The coastline is an area with great potential and of relevance to the country due to its fishing capacity, the natural resources it contains and its potential for tourism and recreation, relevant to the universe of flora and fauna and the resulting benefits for society.

Angola is vulnerable to the rise in the average sea level caused by climate change, as around 50% of its population lives along the coast. In recent years, Angola has been facing several problems with natural disasters, namely in the rainy season and mainly due to construction in risk areas, with an estimated 10% of the Angolan population living in risk areas.

It is predicted that the increase in the average level of the sea waters could reach 0.13m-0.56m in 2090, compared to the years 1980-1999 affecting densely populated areas such as the areas closest to the ocean and the city of Luanda. This rise in level is a serious threat to the coastal population and is responsible for the destruction of infrastructure as well as its corresponding impact on the country's development and on the national economy.

The increase in level and the increase in water temperature will also have an impact on the great currents of the Angolan seacoast (Benguela and Gulf of Guinea), with subsequent changes in salinity levels and existing marine ecosystems. Rivers may also be affected by an increase in the level of salinity in the estuaries. As a result, fisheries along the coastal zone and rivers will be severely affected.

In view of the above, it is important to adapt the country to the consequences that climate change will bring to its coastal areas. The adaptation measures listed in Table 13 and Table 14 aim to contribute to the resilience of its population and economic activities.

Forest, Ecosystem and Biodiversity

While forest sequestration is one of the functions strengthening the response to the impacts of climate change, it is important to recognize that it is not the only climate action provided by forests, as they also deliver beneficial services for climate change adaptation.

Angola has a wide range of ecosystems and a large surface area is covered with shrubs and savannas. The tropical humid forests are found mainly in the provinces of Cabinda, Zaire, Uíge, Kwanza Norte and Kwanza Sul. These are areas of high relevance with regard to the biodiversity they support and therefore their protection is necessary.

The sustainable use of forests and related agroforestry products is hampered by the lack of adequate legal instruments and limited management capacity. However, there is still much untapped economic potential with regard to the country's forest and wildlife resources¹¹.

The impacts of the indirect effects of climate change such as floods, severe droughts and soil erosion will have implications for the increase in displacement and loss of species and also for the increased risk of fire in forests. Stress to flora and fauna caused by variations in climate will condition the life of species, which can cause extinctions. The increase in soil erosion and flooding may affect the distribution and resilience of Angolan biodiversity¹².

The impacts of the indirect effects of climate change such as floods, severe droughts and soil erosion will have implications for the increase in displacement and loss of species and also for the increased risk of fire in forests. Stress to flora and fauna caused by variations in climate will condition the life of species, which can cause extinctions. The increase in soil erosion and flooding may affect the distribution and resilience of Angolan biodiversity.

Water Resources

Angola is a country abundant in water resources, with sufficient availability to satisfy all drinking water needs, if supported by adequate storage, supply, treatment, and distribution infrastructures.

Longer, more frequent and intense droughts will increase the demand for water in areas already impacted by drought, as well as in new drought zones that will arise with climate change. Natural soil erosion aggravated by climate change has implications for sedimentation in river basins.

Although Angola is making a notable effort in terms of adapting to climate change, namely through the adaptation project in the Cuvelai Basin, there is a need to deepen the knowledge and information related to water resources.

Currently, the existing data is not sufficient to formulate a robust assessment of the sources of water supply and the magnitude of the impacts of extreme weather events, such as droughts and floods. In addition, the mechanisms and technical capacities available for climate monitoring are insufficient to support the realization of long-term climate projections. In 1974, Angola had an extensive weather network, with more than 500 weather stations across the country. However, the number of weather stations has been drastically reduced over the years, and there are now about 20.

In these circumstances, the deepening of knowledge and the establishment of robust systems for monitoring watersheds and models for forecasting precipitation with new weather stations will support the creation of efficient systems for preventing and alerting extreme weather events, getting more frequent in Angola.

¹¹ FAO, 2012. Angola Country Programming Framework 2013-2017.

¹² USAID, 2011.

Human Health

The human health has clear links to climate variability through both direct exposure as well as indirect pathways. Obviously, negative health impacts come from extreme climate events, such as heat waves, hurricanes/storms, floods and droughts. Gradual changes of climate affecting water, food and air quality also have negative influence on human health around the world. Additionally, various studies have shown that under climate change scenario, the spread of climate-sensitive diseases such as malaria and diarrhea would increase, and food production would decline resulting in malnutrition.

The incidence of malaria in Angola is one of the highest in the African continent, with more than 3 million people affected today. This disease is the main cause of death in the country (130 per 1000 inhabitants in 2014), affecting the child population in a remarkable way (around 33% of perinatal deaths). It is estimated that about 37% of households are located in areas with environmental diseases such as malaria, diarrhea and cholera, and that about 50% of households living in coastal areas do not have access to piped water.

The high temperatures and changes in precipitation (for example, extreme rainy periods) resulting from climate change lead to the prolongation and, consequently, to the favorable conditions for exponential growth of species of mosquitoes that transmit malaria and other diseases, increasing the number cases and deaths. High temperatures are conducive to prolonging the seasonality of diseases such as malaria, and in a predicted future scenario that is hotter and more humid, even in areas with altitudes above 1500m, where the risk of contracting the disease is lower, episodes of malaria will be more frequent [4].

In order to effectively combat the spread of tropical diseases, it is necessary to provide Angola with knowledge about the relationship between epidemics and extreme climatic events, about the most effective treatments and how to combat their transmission, based on a continuous monitoring of the number and evolution of patients that allows the identification of patterns.

In addition, the “Climate Change Adaptation Action Plan in Africa for the Health sector 2012-2016” [6] prioritizes the identification of risks to human health resulting from extreme climate effects, as well as the strengthening of the health systems of the signatory countries (including Angola), with a view to strengthening the national capacity to prevent and respond to threats to human health.

Infrastructures

Angola's urbanization scenario for the next years will influence the transport sector, leading to an increase in the road network, mainly residential.

The country has invested in the recovery and construction of the road network, which was badly damaged after the conflicts that followed its independence, however infrastructure conditions that are still in a precarious state can be aggravated if no investments are made to increase their resilience and adapt them to new conditions.

Damaged roads and bridges leads to the isolation of communities, difficulties in accessing health and medical emergency services, and may even compromise the evacuation routes of the village in the face of smells, impeding access to schools, workplaces, shops and markets, they interrupt the traffic of goods, leading to a loss of productive capacity and can lead to increased costs for establishing alternative transport routes. In the long term, there may be an increase in road

maintenance costs, especially when they are not well planned to adapt to future weather events, compromising the growth of the economy and the safety of the population.

5.2. Adaptation Contribution

Angola is already experiencing the adverse effects of climate change and recognizes that will seriously undermine efforts towards resilience building, sustainable development and eradicating poverty.

In parallel with the mitigation efforts, it is necessary to develop balanced adaptation actions that allow to minimize the impacts of climate change efficiently and ensure the sustainability of Angola's development. To this end, it is necessary to incorporate into strategies and development plans measures that strengthen current and future resilience to the impacts of climate change, reviewing, if necessary, measures already foreseen.

This challenge – facing climate change – is compounded in coastal areas and cities that are subject to pressure resulting from demographic and economic concentration for which they are not yet fully prepared. A proactive attitude of planning and adaptation increases resilience and brings increased opportunities for lasting growth.

Additionally, the country needs to work on the impacts of climate change on access to WASH (water, sanitation and hygiene) services. To this end, the prioritization of climate resilient WASH interventions is needed to target communities simultaneously suffering from: a) lack of access to basic water and exposed to increasing incidence and frequency of droughts or affected by salinization of coastal aquifers due to sea level rise; b) Lack of access to basic sanitation and hygiene and exposed to increasing incidence of floods and soil erosion. To do that Angola needs to ensure that:

1. WASH infrastructure, services and behaviours are sustainable, safe and resilient to climate-related risks. This goes hand-in-hand with the sustainable use, protection and management of surface and groundwater resources, and resilient waste management;
2. Resilient WASH programmes contribute to building community resilience to help them adapt to the impacts of climate change. To achieve this, inequalities in service provision that disproportionately expose vulnerable groups to climate threats, or restrict their capacity to respond effectively, need to be addressed first. Further WASH contributions to community resilience can be achieved through creating systems that connect communities with local authorities in order to enable their integration into response plans, capacity development and by fostering income generation, as well as food, energy and ecosystem resilience;
3. Finally, Angola needs to work towards a low-carbon WASH sector by improving water and energy efficiency and ensuring, where possible, the use of renewable energy for water and sanitation operations to lower greenhouse gas (GHG) emissions, and energy generation from waste.

Several adaptation measures were identified and analyzed, being selected for Unconditional (Table 13) and Conditional Contribution (Table 14).

Unconditional contributions

Table 13 - Adaptation Measures – Unconditional

Sector	Unconditional Contributions	Impact response	Cost (Million USD) ¹³
Agriculture and Fisheries	Conduct studies on the impact of climate change on fishing productivity and coastal economies	Acidification of the sea and fresh water; Rising water temperature and increased salinization	17,70
	Develop community and school gardens	Increased frequency and intensity of heat waves / heat island effect	5,00
	Apply the national collection of local seeds in programs to improve and create adapted local varieties	Change / Loss of biodiversity	7,50
Coastal Zone	Assess the defense capacity of existing protection structures in risk areas, including the analysis of the feasibility of new investments for the construction of protection structures against sea level rise	Sea level rise	2,00
Forest, Ecosystem and Biodiversity	Develop forest fire prevention actions	Increased frequency and intensity of rural fires	4,50
	Improve the management of existing conservation areas and continue the process of creating new areas	Change / Loss of biodiversity	5,80
Water Resources	Develop characterization studies of hydrographic basins and groundwater	Degradation of assimilation and purification of water courses	3,00
	Increase the number of meteorological and hydrometric stations to improve monitoring of rainfall and watersheds	Increased frequency and intensity of extreme precipitation events	10,00
	Implement a water collection and storage system in drought-prone areas to ensure continuity of human supply and watering of livestock	Increased frequency and intensity of periods of drought and water scarcity	4,83

¹³ The budget figures presented correspond to estimates based on a benchmark exercise with similar actions developed in comparable countries. The implementation of the measures presented requires the determination of a real budget.

Sector	Unconditional Contributions	Impact response	Cost (Million USD) ¹³
Human Health	Improve existing wastewater collection and treatment systems and build new systems in underserved areas focusing on urban areas with a high concentration of population	Health risks and disease transmission	13,82
Infrastructures	Map human settlements at risk of flooding and erosion.	Increased frequency and intensity of extreme phenomena that cause coastal overtopping and erosion	2,00
TOTAL			76,16

Conditional contributions

Table 14 - Adaptation Measures - Conditional

Sector	Conditional Contributions	Impact response	Cost (Million USD) ¹⁴
Agriculture and Fisheries	Conduct a study on the impact of changing the geographical distribution of animal diseases (infectious and parasitic) and the availability of water on the country's animal production levels	Health risks and disease transmission	7,50
	Replicate the project "Promotion of sustainable charcoal in Angola through a Value Chain Approach" in the Luanda-Uíge corridor	Change / Loss of biodiversity	17,88
Coastal Zone	Reinforce inspection in order to condition the occupation of territory located in areas at high risk of flooding coastal areas	Increased frequency and intensity of extreme precipitation events	2,00
Forest, Ecosystem and Biodiversity	Develop models to analyze the effects of climate change on biodiversity and ecosystems based on national and regional climate change scenarios	Change / Loss of biodiversity	5,10
	Actions to preserve forest perimeters in Huambo province, in line with the Government's efforts to elevate the province to the ecological capital of Angola	Change / Loss of biodiversity	3,00

¹⁴ The budget figures presented correspond to estimates based on a benchmark exercise with similar actions developed in comparable countries. The implementation of the measures presented requires the determination of a real budget.

Sector	Conditional Contributions	Impact response	Cost (Million USD) ¹⁴
Water Resources	Create water drainage systems in high-risk areas.	Increased frequency and intensity of extreme precipitation events	14,50
	Build flood protection barriers along the main rivers (vegetation or physical barriers).	Increased frequency and intensity of extreme precipitation events	5,00
	Create a water quality monitoring system for consumption in the main sources of drinking water	Degradation of assimilation and purification of water courses	0,35
Human Health	Implement an early warning system, involving the Civil Protection and the National Institute of Meteorology, in order to reinforce public health contingency and emergency plans in the face of the effects of extreme weather events	Health risks and disease transmission	7,50
Infrastructures	Continuously update the territorial register	Increased soil instability and landslide	5,00
TOTAL			67,83

A woman wearing a red headscarf, a yellow short-sleeved shirt, and a yellow patterned skirt is working in a field. She is holding a wooden tool, possibly a hoe or a similar agricultural implement, and is bent over, working the soil. The background shows a green field with some trees and a blue sky with white clouds.

6.

MEANS OF IMPLEMENTATION

6. MEANS OF IMPLEMENTATION

Angola will require finance, capacity building, technology transfer, partnerships and country driven policy process and institutional arrangements, in order to fully implement the mitigation and adaptation contributions contained in this NDC.

This section provides an overview of those means of implementation.

6.1. Barriers to the implementation of NDC

The integration of climate change adaptation measures into plans, strategies and policies, within the framework of territorial planning instruments at different scales (national, sectoral and provincial) is the first step for measures implementation. However, it faces a set of constraints.

The main barriers were identified together with the main stakeholders, and are as follow:

- Absence or unavailability of basic scientific information, with appropriate details (spatial and/or temporal);
- Absence or unavailability of diagnostic and characterization exercises that include the inclusion of modelling/projections, as well as their implementation in risk mapping and vulnerability analysis;
- Disarticulation of the update and/or review processes;
- Procedural delay and high costs associated with updating and/or reviewing processes;
- Gaps in the level of technical knowledge in the entities responsible for preparing and approving projects, plans and programs;
- Gaps in the processes of early involvement of key players and in the development of communication and public mobilization strategies aimed at the various social and economic agents, with consequent resistance to changing behaviors;
- Budgetary constraints, leading to dilution of priorities over time;
- Limited budgets from the State to create an enabling environment for resource mobilization to encourage private sector investment;
- Lack of binding administrative tools that allow intervention in certain areas.

Angola is committed to overcome the identified barriers.

6.2. Institutional arrangements required for effective NDC implementation

Angola's NDC is based on and aligned with several existing national policies, namely the National Strategy for Climate Change, which was developed considering major national policies, strategies and plans. NDC will be implemented across Ministries in charge of core NDC mitigation and adaptation contributions with the coordination oversight of MCTA. For an efficient implementation of the NDC, it will be essential to ensure good coordination and correct allocation of responsibilities, define regulations and legislation and adopt an integrated monitoring, reporting and verification system. The overriding national implementation arrangement will guide the integration of NDC priority interventions in the broad sectoral planning.

The institutional arrangements proposed for NDC implementation are aligned with ENAC 2020-2035.

6.2.1. Coordination for NDC implementation

The Ministerial Department responsible for the Environment is responsible for the theme of climate change, having for this purpose the Office of Climate Change. This body is responsible for monitoring and participating in Angola in international policy on climate change, being responsible for reporting Angola to UNFCCC, as well as coordinating Angola's participation in the parties' conferences (COP) organized by UNFCCC. The Climate Change Office is the Designated National Authority (DNA) of Angola, responsible for the authorization and participation of projects under the Clean Development Mechanism (CDM).

Following its first strategy for climate change, Angola created the National Commission on Climate Change and Biodiversity (CNACB), with a more specific mandate for climate change and more executive and political harmonization, composed of several entities such as the Ministry Petroleum, Transport, Higher Education, Science and Technology, Health, and Agriculture and Fisheries, under the coordination of the Ministerial Department responsible for the Environment.

Taking into account the past experience of this Commission, it was found that coordination and cooperation between Ministerial Departments and public institutions in the relevant sectors should be further explored. In addition, it was found that it is essential that this Commission redefines its responsibilities, functions and objectives and that it draws up an annual program of activities, in which it defines the calendar of its meetings. Additionally, it is recognized that the extension to the participation in this commission of provincial governments is important for the decentralization process currently underway in the country, which allows these governmental structures to participate in the decisions taken at the national level. In this context, it is proposed to extend the composition of the Commission with other Ministerial Departments and Public Institutions, relevant to the implementation of NDC.

It is also proposed to establish two Committees, the Executive Committee and the Technical Committee in order to guarantee a more operational character and greater efficiency in the Commission's results, particularly with regard to the articulation between the different sectors. The proposed redefinition of the National Commission on Climate Change and Biodiversity is presented in Table 15.

Table 15 - National Commission on Climate Change and Biodiversity - redefinition

National Commission on Climate Change and Biodiversity - redefinition	
Assignments (proposed new assignments)	<p>Concert the Initiatives and harmonize policies for the implementation of the national strategy on climate change and the strategy for the preservation of biodiversity;</p> <p>Create the necessary conditions for the execution and implementation of NDC;</p> <p>Coordinate and articulate the different sectors in the implementation of the Initiatives defined in this NDC;</p> <p>Create a national investment plan that integrates the mitigation and adaptation initiatives foreseen in NDC, articulated with the future Angolan Fund for Climate Change (PAAC);</p> <p>Create centers of excellence to carry out studies of disasters and systematic observations and observation of the climate;</p> <p>Formulate proposals on national mitigation and adaptation policies for climate change;</p> <p>Identify legislative needs on the matter;</p> <p>Coordinate the integration of climate change policies in the various sectors of the economy and at the provincial level;</p> <p>Prepare an opinion on climate policy documents developed by the Ministerial Department responsible for the Environment for submission to UNFCCC;</p> <p>Prepare a recommendation opinion on climate policy documents developed by the Ministerial Department responsible for the Environment for submission to UNFCCC;</p> <p>Develop guidelines for planning and preparing NDC progress assessment reports;</p> <p>Promote public discussion on climate change;</p> <p>Establish an NDC monitoring secretariat.</p>
Composition	<p>Executive Committee, composed of the Minister of the relevant Ministerial Departments, to meet at least quarterly. Technical Committee, composed of focal points technical offices of the relevant Ministerial Departments, to meet at least once a month</p>
Indicators	<p>Elaboration of annual activity plans</p> <p>Creation of working groups to discuss the theme of climate change in the various sectors</p> <p>Meetings held</p> <p>Periodic publication of documents within the scope of Angola's obligations under the UNFCCC (National Communication, INDC, BUR)</p>

The National Commission on Climate Change and Biodiversity must be a medium where the exchange of ideas has a central value, recognizing the enriching role it can play for the country. This secretariat should promote public discussion on its own initiative, on issues related to climate

change, as well as carry out information actions on climate change, both for the general public and in schools, also bearing in mind the promotion of gender equality in participation. public.

In addition, it is important to establish, within the Ministerial Department responsible for the Environment, namely within the Climate Change Office, an NDC monitoring secretariat, which allows the performance of the implementation of the measures registered here to be evaluated, and which is an open way for receiving suggestions from the public, private or public opinion. The results of these assessments must be kept in electronic form, to be subsequently integrated into the future Monitoring, Reporting and Verification (MRV) system of Angolan climate policy. An approach to the specifications of the MRV system in Angola is carried out in subchapter 6.6.

The conceptual coordination model proposed for NDC, aligned with ENAC 2020-2035, is shown in Figure 8.

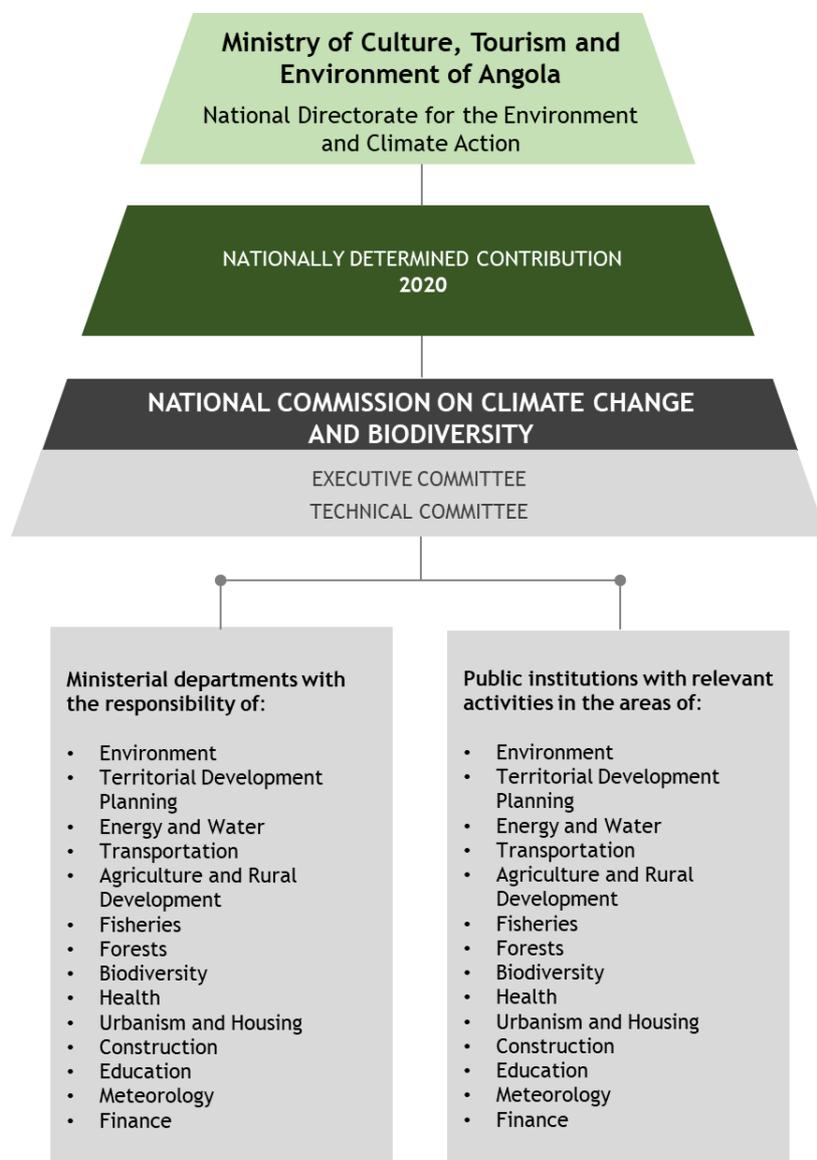


Figure 8 - Institutional Arrangements for NDC Implementation

6.2.2. Responsibilities and Strategic Partnerships required

NDC implementation requires coordination across partners to mobilize resources, deliver complementary services and monitor progress. It will be essential to develop international partnerships to finance the low carbon economy in Angola, through bilateral or multilateral agreements, which allow the flow of resources to permeate the different sectors (energy, industry, mobility, etc.), inducing effective actions of reduction of GHG emissions.

A NDC Partnership Plan, a catalyst document to support the implementation of NDC 2020-2025 should be developed. The NDC Partnership Plan development exercise should involve government institutions at central and provincial levels, non-governmental organizations (NGOs), the private sector, academia and all sector considered in this NDC.

To guarantee an efficient implementation of NDC, it is essential to define the different actors and their role and responsibilities, Table 16.

Table 16 - Actors involved in Angola's climate framework

Stakeholders	Responsibilities
Government and public institutions	<ul style="list-style-type: none"> • Create legislative conditions to provide the best possible environment for developing projects that mitigate climate change; • Implement mitigation and adaptation projects; • Leverage investment, taking advantage of international financing lines; • Budgetary allocation of Angolan funds for climate change; • Sensitize the population and the private sector to the need to respond jointly to the problem of climate change.
Ministerial Department responsible for the Environment	<ul style="list-style-type: none"> • Coordinate and monitor the implementation of NDC; • Represent Angola in the UNFCCC negotiations; • Responsible for reporting under UNFCCC; • Coordinate and develop mitigation and adaptation measures; • Coordinate and develop training and awareness actions; • Coordinate and boost climate finance.
Private sector	<ul style="list-style-type: none"> • Take advantage of investment lines to develop mitigation and adaptation projects; • Participate in the provision of data for the national GHG inventory; • Mobilize international investment funds to improve process efficiency and make more rational use of energy; • Cooperate with the Government in the establishment of projects that mitigate climate change; • Actively participate in the definition of sectoral policies for climate change.
Civil society	<ul style="list-style-type: none"> • Adopt more conscious daily behaviours, which lead to a smaller carbon footprint;

	<ul style="list-style-type: none"> • Promote community mitigation and adaptation projects; • Participate in the global effort to fight the effects of climate change in Angola.
Universities / research institutes	<ul style="list-style-type: none"> • Develop scientific knowledge in the area of climate change; • Include climate change content in university programs; • Train citizens who are aware and aware of the urgency to act on the effects of climate change.

6.3. Capacity building and technology transfer required

Under the Paris Agreement, developed countries have also committed to provide technology transfer and capacity building to developing countries. Many developing countries will require enhanced capacities to effectively track inflows of bilateral and multilateral resources and support and identify pending gaps and needs. And support effective and efficient implementation of resources, and good documentation.

Angola recognizes that capacity building and technology transfer is an important component of international support to the country and for its efforts in combating climate change and in reducing its vulnerabilities. In this way, the country has developed an analysis of its needs in terms of capacity building and technology transfer for the short term related with mitigation and adaptation. The National Strategy for Climate Change identifies capacity needs to succeed the targets of each mitigation and adaptation measure.

Specific national needs related to mitigation and adaptation to climate change include:

- Better knowledge on new and more efficient technologies among the different sectors and public and private entities
- Increase qualified human resources for the development and implementation of mitigation and adaptation actions
- Build national capacity for the development of low carbon technologies
- Expand knowledge and access to financing mechanisms by public and private entities
- Create a robust national data collection system

In this context, the Government of Angola plans to:

- Promote information sessions for private investors on the regulation of renewables in the country
- Awareness raising and communication campaigns about:
 - renewable energy and energy efficiency
 - good maintenance of own vehicles
 - use of public transportation
 - waste management: waste collection, recycling, circular economy
 - health impacts of climate change
- Strengthen the climate modelling capacity of agricultural production systems

- Create early warning systems in order to support communities and reinforce contingency and emergency plans

Besides that, there are other two thematic areas where the government intends to act, which are institutional and climate change education in schools and university, as education is an essential component and a facilitator for responding to global climate change. Angola's goals related to capacity building training and education are presented in the table below.

Table 17 – Capacity building actions

Capacity building	Actions
Institutions	Ensure public service has climate change training sessions
	Ensure ministerial officers are trained on climate change
Schools and Universities	Train teachers and educators on climate change, to promote climate change education
	Integration of climate change education in school curricula
	Include degrees focused specifically on teaching the complex problems and solutions to climate change in Angola's universities

6.4. Financial requirements

An initial assessment of the funding requirements for the identified measures is described below and implementation costs will be refined as more evidence-based information is obtained.

The total estimated cost for Angola's identified NDC mitigation contribution through 2025 is estimated at around 44 billion USD and 144 million USD for adaptation contribution, representing a combined funding requirement of around 44.1 billion USD, across sectors.

The Table 18 summarizes the estimated funding needs. For both mitigation and adaptation combined, the mitigation unconditional contribution, account for around 99.7% of the total estimated funding requirements, and the adaptation contribution around 0.3%.

Table 18 – Estimated mitigation and adaptation funding needs

Contribution	Unconditional (million USD)	Conditional (million USD)	Total (million USD)	Total (%)
Mitigation 2020-2025	32 313,00	11 638,02	43 951, 02	99,7%
Energy	3 890	2 428	6 318	14,33%
AFOLU	416	209	625	1,42%
Industry	28 000	9 000	37 000	83,91%
Waste	7	1	8	0,02%

Adaptation 2020-2025	76,16	67,83	143,99	0,3%
Agriculture and Fisheries	30,2	25,38	56	0,13%
Coastal Zone	2	2	4	0,01%
Forest, Ecosystem and Biodiversity	10,3	8,1	18	0,04%
Water resources	17,84	19,85	38	0,09%
Human Health	13,82	7,5	21	0,05%
Infrastructures	2	5	7	0,02%
Total	32 389,16	11 705,85	44 095,01	100%

Lack of funds is the main obstacle to development and implementation of actions that may assist in climate change mitigation and adaptation. The funding issue is also a major impediment to national research and development efforts, as well as to human and institutional capacity. Thus, climate finance leveraged by Angola is a key factor for NDC success in implementing its mitigation, adaptation and capacity building initiatives.

6.5. Funding options

Angola's contribution will be implemented with both domestic and international support. Unconditional contribution will be achieved based on national investment for NDC implementation.

Angola intends to meet its conditional contribution through the use of climate finance and international market mechanisms where appropriate., building upon the experience of the Clean Development Mechanism (CDM) and other existing market mechanisms. These include the potential involvement in international cooperative approaches under Article 6 of the Paris Agreement. Article 6 of the Paris Agreement allows Parties to voluntarily cooperate in the implementation of their NDCs through market and non-market-based mechanisms. Negotiations on Article 6 are currently underway, and the country is following the opportunities that can arise from the future carbon market.

In addition, Article 13 of the Paris Agreement establishes a transparency framework to provide a clear understanding of climate change action, mutual trust and confidence that involves reporting data in a regular basis.

6.5.1. National Framework for Climate Finance

Since Angola ratified the UNFCCC in 2000 and the Kyoto Protocol in 2007, it has managed to use some of the international financial instruments for climate action and at national level to mobilize public and private funds for mitigation and adaptation measures.

However, the level of financing necessary for the development of the measures indicated in previous chapters is still lower comparing to the real needs that the country presents. At the

national level, Angola has been experiencing a sharp slowdown in its economic growth for some years, motivated by the drop in oil production, with a negative impact on the internal capacity to finance all of its economic activity.

In accessing international financing, it is important to highlight the current PMA graduation process which, despite being a process that reflects national economic and social development, will have some disadvantages in accessing finance in the international markets from which LDCs benefit:

1. Special and differential treatment in the World Trade Organization (WTO), namely longer periods in the implementation of multilateral agreements and commitments;
2. Public Development Aid: the international community has committed a series of financing lines to support LDCs (Example: Angola received financial assistance from the Least Developed Countries Fund which is exclusive to LDCs);
3. Preferential market access: Preferential market access gives LDC exporters the right to benefit from lower tariffs or even exemption from customs duties.

The section below describes the main financial instruments, national and international, available and used by Angola in its climate finance.

National Climate Finance

At the national level, Angola has a relatively small set of financing lines for mitigation and adaptation measures. The main instrument used by the Government for the management and conservation of the environment is the National Environment Fund (FNA). In addition, there are other instruments and funds capitalized through the state budget that support climate projects and programs.

Table 19 describes these national funds briefly.

Table 19 - Fundos nacionais utilizados para medidas de mitigação e adaptação

National Environment Fund (FNA)¹⁵	
Description	The FNA was created in January 2011 and is administratively supervised by the Ministerial Department responsible for the Environment. Its objectives are: Financially support the management, promotion and conservation of the environment; Contribute to the promotion of activities related to the rational management of environmental protection areas, rehabilitation or recovery of degraded areas; Support technical and scientific activities for the introduction of clean technologies; Support the activity of civil society.
Financing sources	Budget appropriations; Percentage of the values of environmental licensing fees;

¹⁵ MINEA (2017).

	<p>Percentage of fines applied;</p> <p>Proceeds from the sale of the seal or certificate of clean technologies;</p> <p>Values from pollutant emission rates;</p> <p>Compensation and compensation.</p>
National Electricity Fund (FUNEL)[18]	
Description	<p>FUNEL intends to support the fulfilment of the Angola Energia 2025 vision by supporting rural electrification programs. The fund's allocations, rules and management will be carried out by the National Institute of Rural Electrification (INER). Its objectives are:</p> <p>Support renewable energy projects connected to the grid;</p> <p>Finance or subsidize rural electrification;</p> <p>Support the distribution of improved solar lanterns and ovens, manufactured in Angola;</p> <p>The performance of CDM procedures reverting their benefits to the financing of rural electrification.</p>
Financing sources	<p>State financing via concessions;</p> <p>Articulation with the Sovereign Fund of Angola (FSDEA), which will seek to take a minority stake in larger projects;</p> <p>Collaboration with local banks for credit lines;</p> <p>Cooperation with international entities to maximize obtaining non-repayable financing.</p>
Support Fund for Agricultural Development in Angola (FADA)	
Description	<p>Created under Executive Decree no. 40/87, FADA was reactivated in October 2016, under the supervision of the Ministry of Finance, as a “specialized financial institution” designed to support the country's agricultural development policy. According to government data, the agriculture sector adds more than 80% of the country's labour force and represents less than 10% of the national GDP. The fund is intended to be an instrument to boost agriculture, one of the priority sectors for the diversification of the national economy. The Government intends to develop the sector by promoting the local, regional and national economy and being a driving force for compliance with SDG 2: Eradicate hunger, achieve food security, improve nutrition and promote sustainable agriculture.</p>
Financing sources	<p>Tax revenue associated with the import of agricultural products;</p> <p>State budget.</p>
Angola Sovereign Fund (FSDEA)[46]	
Description	<p>On November 20, 2008, the President of Angola, José Eduardo dos Santos, announced the establishment of a special commission to create the basis for a new Sovereign Wealth Fund (FSR) in order to promote growth, prosperity and socio-economic development in Angola. In 2011, the Fund was legally ratified and officially established as the Angola Sovereign Fund in 2012, with an initial</p>

	allocation of US \$ 5 billion. Its objective is to promote the social and economic development of Angola, generating wealth for the Angolan people.
Financing sources	FSDEA is capitalized with revenues from oil exports and an important part of its investments are allocated to national energy conversion. FSDEA has already allocated \$ 1.1 billion to a venture capital fund for the infrastructure sector with capital-intensive investments in the energy, transport and industry sectors. In terms of agriculture, FSDEA has allocated \$ 250 million. FSDEA expects that its investments in the agricultural sector will contribute decisively to economic growth in Angola and other regions of the continent by increasing the revenues from this activity.

Despite the existence of these climate finance instruments, the financial allocation to mitigation and adaptation measures may be further enhanced with greater financial availability and in order to cover all priority sectors / domains.

International Climate Finance

In terms of international climate finance, the following instruments used by Angola to finance mitigation and / or adaptation to climate change projects are identified [5], Table 20.

Table 20 - International financing instruments for mitigation and adaptation

Least Developed Countries Fund [50]
By the end of 2016, 4 adaptation projects were approved in Angola with a total grant amount exceeding USD 25 million and channeled through the following DFIs: African Development Bank (AfDB), United Nations Development Program (UNDP) and Organization United Nations Food and Agriculture Organization (FAO). The overall amount of co-financing for these projects amounted to approximately US \$ 90 million.
GEF Trust Fund
By the end of 2016, 2 projects in Angola (1 for mitigation and 1 for adaptation) with a total grant amount exceeding US\$ 7 million and channelled through the following DFIs were approved: United Nations Development Program (UNDP) and by Food and Agriculture Organization of the United Nations (FAO). The global co-financing value of these projects amounted to approximately US \$ 36 million.
Carbon Markets (MDL)¹⁶
Angola has only one project registered under the CDM mechanism, the Gove hydroelectric power station. The project was registered in 2014 and has the potential to reduce 126,118 tCO ₂ e / year. By the end of 2016 the project had not issued any certified emission reduction (CER) and therefore had no access to finance from developed countries.

¹⁶ See section 6.1.1. Carbon Markets

Angola also benefited from funding from a number of financial and bilateral institutions that include the International Fund for Agricultural Development (IFAD), the European Development Fund (EDF), the French Fund for the World Environment (FFEM), German cooperation through the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), UNDP and the United Nations Environment Program (UNEP, or in English UNEP - United Nations Environment Program).

Angola also benefited from the Fast-Start financing program that was agreed upon at COP15, in 2009, in which developed countries pledged to channel resources worth around US \$ 30 billion for the period between 2010 and 2012 to support efforts in developing countries.

In a global way, Angola should take advantage of the main international financial instruments already identified (Green Climate Fund, Adaptation Fund GEF Trust Fund, Least Developed Countries Fund, Special Climate Change Trust Fund) and maximize the use of existing national funds (Fundo Nacional do Environment, National Electricity Fund, Support Fund for Agricultural Development of Angola and Sovereign Fund of Angola) in order to cover all identified mitigation and adaptation sectors / domains.

6.5.1. Carbon Markets

Carbon markets have played an important role in channeling climate finance for mitigation since 2005, when the Kyoto Protocol came into force.

The main mechanism defined in Article 12 of the Protocol was the Clean Development Mechanism (CDM). This mechanism was designed with two main objectives: to support developed countries to achieve their emission reduction objectives in a cost-effective manner and to support developing countries and those least advanced in sustainable development. The mechanism allows the financing of emission reduction projects through the certification and transaction of certified emission reductions (Certified Emission Reduction - CER).

By the end of the first quarter of 2017, more than 7,700 projects had been registered and more than 1.7 billion emission reductions had been certified. For the period between 2007 and 2011, it was estimated by the UNFCCC that the financial transactions of CERs totalled around 9.5 billion dollars. A significant part of this value was mobilized by the private sector. However, the market generated by the CDM has suffered a drastic reduction in value since 2011 as a result of the main CER buyer market, the European Emissions Trading System (EU-ETS), defining a very significant reduction in CER usage limits. As a result of the level of demand having drastically reduced, RECs are no longer desirable for public and private actors to allocate financial resources to mitigation projects in developing countries.

The role of carbon markets in global climate finance is still considered very relevant by a considerable number of countries and regions. By the end of 2019, around 40 countries and more than 20 cities, states and regions used carbon markets as climatic instruments, which represents about 13% of annual GHG emissions worldwide [25].

A positive trend observed in the African continent was the growth of CDM programmatic approaches (from English, Program of Activities - PoA¹⁷) that allowed to extend the channelling of climate finance in countries and regions that are still under-represented.

The CDM is part of a type of financing called Results-based-finance (RBF) that channels funds into projects and programs through the achievement of verified objectives. There has been a significant growth in this type of financing in recent years. The Green Climate Fund, for example, is considering this type of approach in allocating its funding [12].

The relevance of the carbon markets was also evident in Article 6 of the Paris Agreement, which establishes the creation of a new sustainable development mechanism that aims to succeed the Kyoto mechanisms and that will produce “mitigation units” called ITMOs (Internationally Transferred Mitigation Outcomes) that can be used to meet the mitigation objectives set out in the NDCs. At a time when carbon markets are spreading and developing all over the world, it will be strategic for African governments to position themselves regarding access to and use of these financial instruments.

6.6. Monitoring, Reporting and Verification (MRV) system

The evolution of international negotiations on Climate Change has determined a set of reporting obligations over time. In addition, Angola's graduation from PMA scheduled for 2021 will have implications in terms of reporting to UNFCCC.

Before the Cancún Agreements, developing countries were asked to produce their National Communications but on a voluntary basis, in accordance with Articles 4 and 12 of the Convention, but at COP 16, in 2010, more demanding reporting targets were set for developing countries, namely the obligation to produce National Communications (CN) every 4 years and the production of biennial update reports (BUR) every 2 years, which means that the national emissions inventory will have to be produced every two years.

In 2015, the Paris Agreement brought a set of challenges on the accounting and reporting of GHG emissions and mitigation and adaptation actions developed by the countries, calling for transparency, rigor, comparability and consistency in accounting and reporting: beyond the CN and BUR, the Parties are now subject to the production and five-year update of their national contributions (NDCs) every 5 years.

These developments in international climate policy mean that from 2021 onwards Angola will, in the light of the UNFCCC, be obliged to elaborate:

- a) National Communication every 4 years;
- b) the Biennial Update Report every 2 years;
- c) NDC update every 5 years.

¹⁷ Activity Programs (PoA) incorporate within an individual program / project an unlimited number of activities with the same characteristics.

In view of the challenges presented, it is important to implement a Monitoring, Reporting and Verification (MRV) system that ensures efficient monitoring of the implementation of climate policy in the country.

Monitoring, Reporting, and Verification (MRV) refers to the process by which countries track and report on the implementation and impacts of mitigation and adaptation actions, and the finance used to support these actions. To date, in Angola there is no domestic system in place in order to track the implementation of the NDC. The information available is often dispersed and incomplete, and difficult to collect.

Thus, responding to the control needs of its national internal policy and the new challenges of the Paris Agreement, Angola will establish an MRV system consisting of 4 subsystems: GHG inventory, mitigation measures, adaptation measures and financial, technical and technological support, Figure 9.

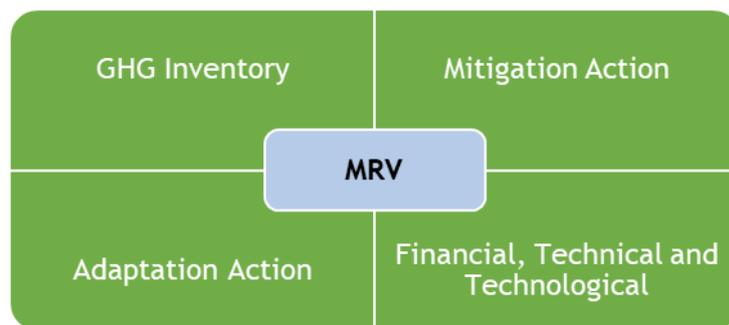


Figure 9 - Components to be developed for the MRV System in Angola

The operationalization of a national MRV system will allow not only to elaborate in a systematic way the national inventory of GHG emissions in Angola, essential for the improvement of the reporting process to UNFCCC, but also to serve as a tool to implement this strategy, to ensure an efficient implementation of climate policy in the country. Additionally, the implementation of an MRV platform will represent a valuable database for the country for the development of future policies not only in the environmental area, but also in areas such as land use planning or industrial policy.

Using the database of this system, it will be possible to assess the most polluting sectors of the economy and develop political tools that serve to encourage the reduction of GHG emissions, measure the implementation of adaptation measures, in addition to monitoring the support received (financial, technical and technological). The Government believes that the transparency that this system will bring to the implementation of the Angolan climate policy will also allow it to leverage more international financing for the country.

The Ministerial Department responsible for the Environment is responsible for the development of the MRV system and for the coordination of its implementation, which must include:

1. Plan of methodologies and base data
2. Knowledge management system
3. Capacity development plan
4. Quality control and quality assurance system
5. Legal and institutional framework

The Methodology and Base Data Plan will define the methodologies to be applied in the monitoring of GHG emissions, mitigation and adaptation measures and financial, technical and technological support.

The Knowledge Management System to be developed should aggregate all the information collected by the various subsystems, allowing consultation and data entry in a simple and systematic way.

On the other hand, in order for the system to be implemented efficiently, a process of training focal points from different ministries, relevant entities in data collection, must be initiated, as well as training technicians from provincial governments, so that they can in turn , train other actors. The Capacity Development Plan should identify the training needs for the implementation of the MRV system at different levels.

Quality control and quality assurance are fundamental to the effectiveness and credibility of the system. In particular for the GHG inventory, the definition and implementation of a quality assurance and control system is considered a good practice required by UNFCCC.

Finally, the legal and institutional framework should be defined to formalize the implementation of the MRV system, as well as to define responsibilities and deadlines that will constitute the annual cycles of the MRV system in Angola. Figure 10 shows a schematic of the MRV system that the Government of Angola intends to operate in the country.

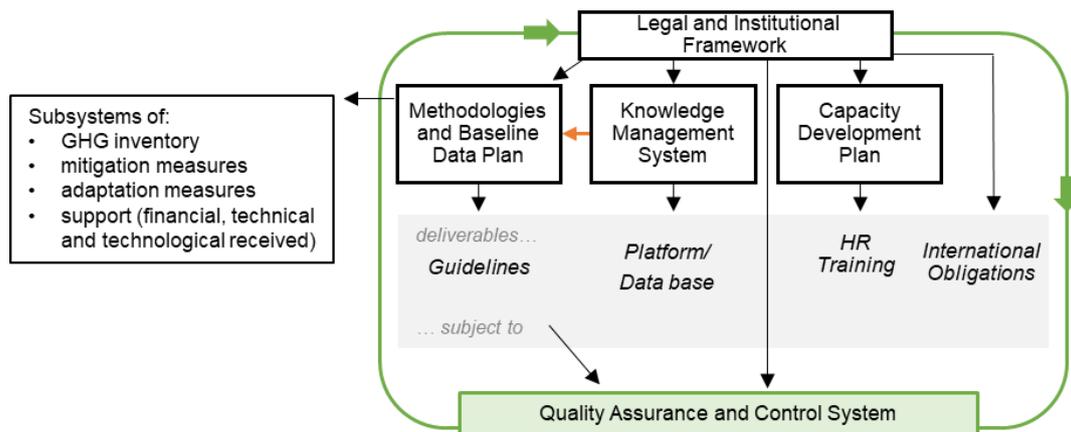


Figure 10 - Subsistemas do Sistema de MRV Nacional a desenvolver

For the short term (up to 2025), it is planned that Angola will develop and implement a MRV system, as part of the tracking process of the NDC. Angola aims to integrate the necessary MRV activities into existing processes and structures for international reporting to ensure an efficient and consistent approach. Angola is in the process of determining the most appropriate process for MRV of NDC implementation and is intending to implement a robust MRV system.

Regarding the process of monitoring and evaluation, the mitigation efforts will be assessed on an annual basis, based on the implementation results of the mitigation contributions proposed. In order to cross-check the mitigation results, an update of GHG inventory will be conducted annually at both the national and sector levels.

Adaptation efforts will be assessed through indicators of resilience based on the implementation process and results and international indexes, as the vulnerability to climate change and climate-related risk reduction¹⁸.

Examples of relevant indicators are [39]:

Area	Indicator
Climate parameters	Change in annual temperature
	Mean monthly temperature
	Number of hot days
	Change in annual precipitation
	Monthly precipitation
	Extreme precipitation events
Climate impacts	Number of households affected by drought
	Percentage of total livestock killed by drought
	Number of people at high risk of heat stress
	Number of people living in flood prone areas
	Number of properties flooded per year
	Number of properties located in river/coastal floodplain
	Number of hectares of productive land lost to soil erosion
	Total forest area impacted by wildfire per year
	Weather-related disruption of electricity supply
	Number of properties lost due to coastal erosion per year
	Losses of GDP in percentage per year due to extreme rainfall
Adaptation Action	Number of public awareness campaigns on water efficiency
	Number of government staff that have received training on adaptation
	Degree of integration of climate change into development planning
	Percentage of municipalities with local regulations considering adaptation and vulnerability assessment results
	Existence of interministerial/ intersectoral commissions working on adaptation
	Uptake of early warning systems
	Percentage of coastline under marine protection
	Number of financial mechanisms identified to support climate change adaptation

¹⁸ For example: [World Risk Index](#), [Global Climate Risk Index](#)

7.

FAIRNESS AND AMBITION



7. FAIRNESS AND AMBITION

National emissions of the greenhouse gases represent only 0.10%¹⁹ of global in 2015.

This NDC is fair and ambitious as it aims to secure limited increase of its greenhouse gas emissions, while the country pursues a strong economic development pathway. Angola will take into account the ultimate objective of the UNFCCC in its future development and committed to decouple greenhouse gas emissions from its economic growth and embarks on a low emission development pathway.

Also, this NDC present a significant commitment, through both mitigation and adaptation measures at the sector-level, to reach indicated contributions, prepared through an extensive consultation process with stakeholders.

The impacts that the current pandemic COVID - 19 will have in the country are not certain yet, but it is already identified that the impacts in terms of the economy and public health may delay the implementation of the proposed objectives. Thus, given the current socio-economic development of a developing country affected by climate change, in its updated NDC Angola has shown the country's highest level of efforts in contributing to global climate change mitigation and implementation of the Paris Agreement.

¹⁹ Angola: CO2 Country Profile: <https://ourworldindata.org/co2/country/angola?country=~AGO#what-share-of-global-co2-emissions-are-emitted-by-the-country>



8.

INFORMATION TO FACILITATE CLARITY,
TRANSPARENCY AND UNDERSTANDING

8. INFORMATION TO FACILITATE CLARITY, TRANSPARENCY AND UNDERSTANDING

In accordance with the provisions of Annex I of Decision 4/CMA.1, Angola informs the following:

Parameter		Information
NDC Time period		Start year: 2020 End year: 2025
Type of commitment		The type of contribution selected by Angola in terms of mitigation is based on results, i.e. the reduction of greenhouse gases to levels below the BAU. The BAU scenario by 2025 was based on the last GHG inventory of 2015.
Reference point & base year		In 2015 (base year), emissions were about 99992 ktCO ₂ eq, and BAU projection indicates that to fulfil the condition of the supposed growth parameters by 2025, the emissions will reach 108473 ktCO ₂ eq.
Accounting methodology		With the support of GACMO model, developed by UNEP DTU Partnership, the BAU scenario was constructed based on the national GHG Inventory of 2015, according to the 2006 IPCC Guidelines. The mitigation measures were selected and prioritized based on consultation with stakeholders, which formed the basis for the calculation of the mitigation scenario, calculated using the GACMO model.
Metric applied		Global Warming Potential on a 100-year timescale in accordance with the IPCC's 4th Assessment Report.
Reduction level (Unconditional)		At least 14% domestic reduction in greenhouse gas emissions by 2025.
Reduction level (Conditional)		Additional 10% of GHG reduction by 2025
Scope and coverage	Greenhouse gases (GHG)	CO ₂ , CH ₄ , N ₂ O. F-gases emissions are not counted as they were considered negligible across the country.
	Coverage (sectors)	<p>The mitigation component identifies measures for the period 2020-2025 in the following sectors: Energy (including Transport); Agriculture, Forestry and Other Land Use; Industry; Waste.</p> <p>The adaptation component identifies measures for the period 2020-2025 in the following sectors: Agriculture and Fisheries; Coastal Zone Forests, Ecosystems and Biodiversity; Water Resources; Human Health; Infrastructures.</p>

	<p>Angola adaptation measures are aimed at improving the country's ability to adapt to the adverse consequences of climate change, thus contributing to country's development.</p> <p>The rationale for the inclusion of the adaptation component in the NDC takes into consideration that the country shows vulnerability and fragile conditions as a developing country, for which negative impacts of climate change are evident in all sectors of the national economy.</p>
	<p>Geographical boundaries Whole country</p>
<p>Means of implementation</p>	<p>To implement the listed mitigation and adaptation measures, it is estimated that a total investment of not less than US\$ 4.1 billion in the form of internal and external aid will be required between 2020 and 2025. Angola requests the technologies support and capacity building.</p>
<p>Gaps and Barriers</p>	<p>Angola faces several barriers in addressing climate change issues, mainly related to:</p> <ul style="list-style-type: none"> • Absence or unavailability of basic scientific information, with appropriate details (spatial and/or temporal); • Absence or unavailability of diagnostic and characterization exercises that include the inclusion of modelling/projections, as well as their implementation in risk mapping and vulnerability analysis; • Disarticulation of the update and/or review processes; • Procedural delay and high costs associated with updating and/or reviewing processes; • Gaps in the level of technical knowledge in the entities responsible for preparing and approving projects, plans and programs; • Gaps in the processes of early involvement of key players and in the development of communication and public mobilization strategies aimed at the various social and economic agents, with consequent resistance to changing behaviors; • Budgetary constraints, leading to dilution of priorities over time; • Limited budgets from the State to create an enabling environment for resource mobilization to encourage private sector investment; • Lack of binding administrative tools that allow intervention in certain areas.
<p>Intention to use market-based mechanisms to meet targets</p>	<p>According to the Marrakesh Call for Climate Action, agreed at the Ministerial Dialogue of the Seventh</p>

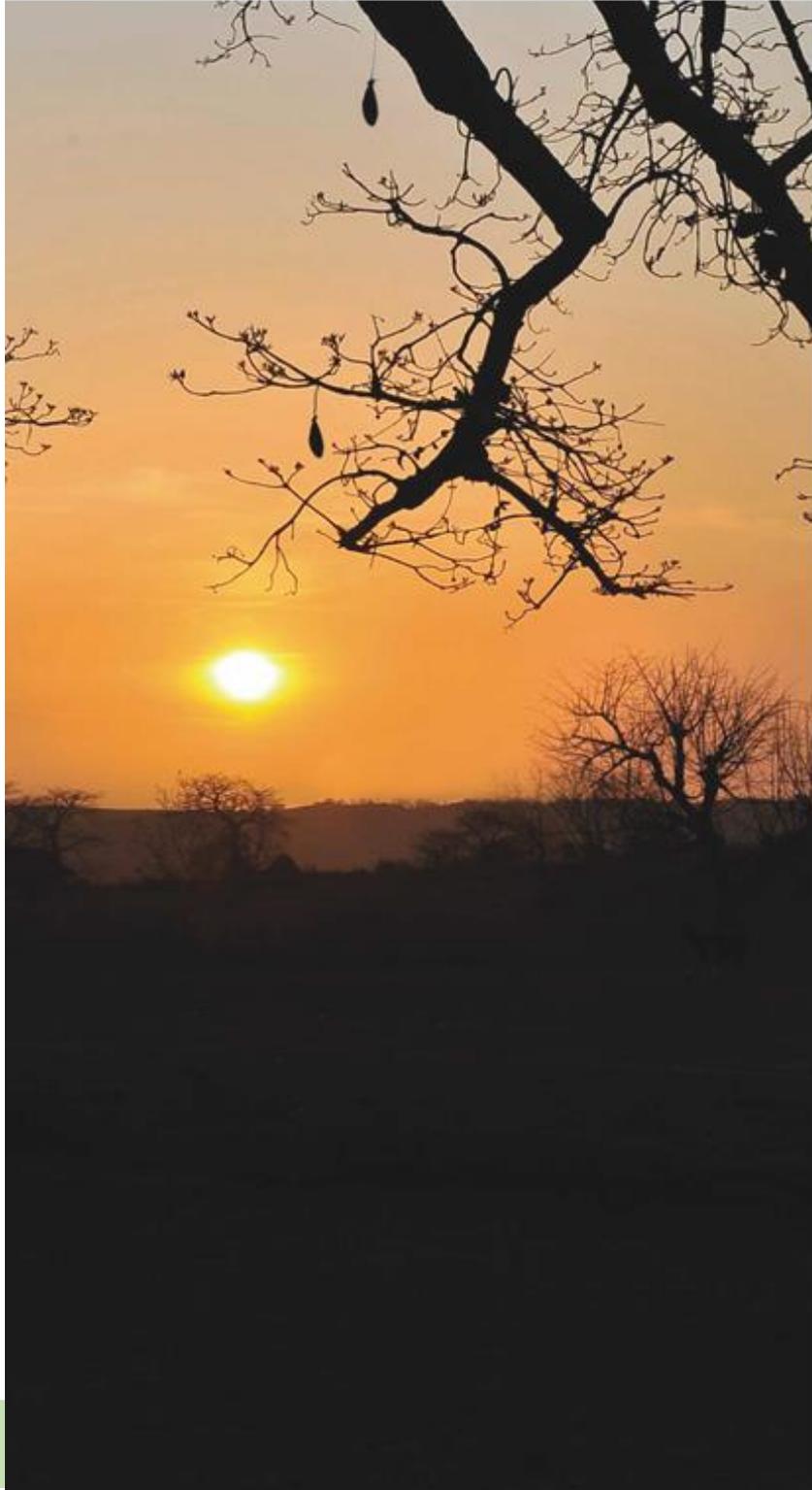
	<p>African Forum of Carbon, in April 2015, Angola recognizes the experience gained from the implementation of the Clean Development Mechanism and want to be supported by market mechanisms with high environmental integrity, contributing to sustainable development and establishing strong incentives to harness the power of private sector. Angola supports the use of market mechanisms including the results of mitigation pre-2020, such as the use of Emission Reduction Certificates (ERCs) generated by CDM projects and programs.</p>
<p>Fair and ambitious</p>	<p>Angola is a developing country, highly vulnerable to the effects of the climate change. National emissions of the greenhouse gases represent only 0.10% of global emissions (2015).</p> <p>The NDC submitted by Angola is fair and ambitious because it aims to secure limited increase of its greenhouse gas emissions while it the country pursues a strong economic development pathway. Given its extreme vulnerability and dependence on external support, Angola’s proposed targets are fair and ambitious.</p>

A revised GHG Inventory is a prerequisite for operating a monitoring, reporting and verification (MRV) system suitable to tracking the contributions of NDC-aligned projects. In 2020, Angola updated its GHG inventory (base year: 2015) and by 2025 the country is planning to revise and update that GHG Inventory as part of its Second National Communication.

Angola requests the UNFCCC Secretariat that this submission is published on the UNFCCC webpage and that the country's NDC is included in the synthesis report to be prepared by the Secretariat.



9. REFERENCES



9. REFERENCES

Documents

- [1] UN General Assembly (1995). Resolutions adopted by the General Assembly during its forty-nine session, A/RES/49/133, 14 February 1995
- [2] 2006 IPCC Guidelines on National Greenhouse Gas Inventories. Link: <https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>
- [3] Ministry of Economy and Planning: Long-Term Strategy, 2025, 2007. Link: <http://extwprlegs1.fao.org/docs/pdf/ang184675.pdf>
- [4] National Adaptation Programme of Action, UNFCCC 2011. Link: <https://unfccc.int/resource/docs/napa/ago01.pdf>
- [5] UNFCCC Angola 1st National Communication, 2012. Link: <https://unfccc.int/resource/docs/natc/agonc1.pdf>
- [6] Climate Change Adaptation Action Plan in Africa for the Health sector 2012-2016, 2012. Link <https://climhealthafrica.org/wp-content/uploads/2015/09/Climate-Change-Plan-of-Action.pdf>
- [7] Republic of Angola, 2012 - Strategic Urban Waste Management Plan (PESGRU). Link: <http://extwprlegs1.fao.org/docs/pdf/ang124587.pdf>
- [8] IPCC 5th Assessment Report: Climate Change 2014. Link: <https://www.ipcc.ch/assessment-report/ar5/>
- [9] Carabine E. and Lemma A. (2014), The IPCC's fifth assessment report: what's in for Africa? Overseas Development Institute and Climate and Development Knowledge Network. Link: <https://environmentalmigration.iom.int/ipcc%E2%80%99s-fifth-assessment-report-what%E2%80%99s-it-africa>
- [10] INE (2016). Census 2014. General Population and Housing Census in Angola 2014 – Final Results. Link: <http://censo.ine.gov.ao/xportal/xmain?xpid=censo2014>
- [11] Republic of Angola, 2015. Intended Nationally Determined Contribution for the Republic of Angola. Republic of Angola. Link: http://www.un-gsp.org/sites/default/files/documents/indc_angola_deposito.pdf
- [12] New Climate Institute (2015). Connecting the dots, Results-based financing in climate policy. Link: <https://newclimate.org/2015/08/27/connecting-the-dots-results-based-financing-in-climate-policy/>
- [13] Atlas and National Strategy New Renewable Energies, 2015. Link: <https://gestoenergy.com/wp-content/uploads/2018/04/ATLAS-AND-NATIONAL-STRATEGY-FOR-THE-NEW-RENEWABLES.pdf>

- [14] United Nations (2015a). Committee for Development Policy Report on the seventeenth session (23-27 March 2015) Economic and Social Council Official Records, 2015 Supplement No. 13 E/2015/33. United Nations. New York.
- [15] INE Angola, 2016. Population projection 2014-2050.
- [16] UN General Assembly (2016). Resolution adopted by the General Assembly on 12 February 2016, Graduation of Angola from the least developed country category 70/253
- [17] Republic of Angola (2016). Guidelines for Defining a Strategy for Exiting the Crisis Derived from Falling Oil Prices in the International Market. Link:
- [18] Ministry of Energy and Water (2016). Angola Energy 2025: Long term vision for electric sector. Link: <https://gestoenergy.com/wp-content/uploads/2018/04/ANGOLA-POWER-SECTOR-LONG-TERM-VISION.pdf>
- [19] Ministry of Economy and Planning, 2018, National Development Plan 2018-2022. Link: <http://extwprlegs1.fao.org/docs/pdf/ang179971Plan.pdf>
- [20] Republic of Angola, 2017. National Strategy for Climate Change. Republic of Angola. Link: https://info.undp.org/docs/pdc/Documents/AGO/ENAC%202018-2030_14082017.pdf
- [21] Republic of Angola, 2017, First Annual Report On The Angola Graduation Process From LDC Category, Monitoring of Graduated and Graduating Countries from the Least Developed Country category: Angola, CDP2017/PLEN5-Annex 1, February 2017.
- [22] African Development Bank, African Economic Outlook 2019. Link: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/2019AEO/AEO_2019-EN.pdf
- [23] Angola Disaster Risk Profile, 2019. Link: <https://www.undrr.org/publication/disaster-risk-profile-angola>
- [24] United Nations Development Programme (UNDP). Human Development Report 2019: Angola. Link: https://www.ao.undp.org/content/dam/angola/docs/Publications/HDR%202019_Angola.pdf
- [25] World Bank (2019). State and Trends of Carbon Pricing 2019. Link: <https://openknowledge.worldbank.org/handle/10986/31755>
- [26] International Energy Agency, Africa Energy Outlook – Overview: Angola 2019. Link: <https://www.iea.org/articles/angola-energy-outlook>
- [27] INE, 2019. Final Report on Multidimensional Poverty in Angola. Link: https://ophi.org.uk/wp-content/uploads/Angola_PM_2020.pdf
- [28] Climate Change Adaptation Plan for the Coastal Zone of Angola, 2019. Link: https://info.undp.org/docs/pdc/Documents/AGO/Get2C_ProdutoIV.1%20-%20Final%20Draft.pdf

- [29] Ministry of Transport, 2019 - National Master Plan for the Transport Sector & Preliminary Feasibility Study for the Railway Link between the Benguela Railway (CFB) and Zambia. Link: <https://adfersit.pt/uploads/article/27/angola-planodirectornacionaldosectordostransportes.pdf>
- [30] Ministry of Finance 2019, State Budget Report 2020. Link: http://www.parlamento.ao/oge/orcamento-geral-estado-2020/-/document_library/view/713022;jsessionid=0CEE3D3C4AD1EDD1784275261961B481#http://www.parlamento.ao/glue/AN_Navigation_home.jsp?
- [31] Creating Markets in Angola: Opportunities for Development Through the Private Sector, World Bank 2019. Link: <https://openknowledge.worldbank.org/handle/10986/31618>
- [32] Country Engagement Strategy: A Country-Driven Approach For Collective Impact On Climate And Development Action, October 2020. Link: https://ndcpartnership.org/sites/all/themes/ndcp_v2/docs/country-engagement/NDCP_CountryEngStrategy_Final.pdf
- [33] Integrated Plan for the Acceleration of Agriculture and Artisanal Fisheries (PIAAPF), 2020. Link: <https://www.adra-angola.org/artigos/plano-integrado-de-aceleracao-da-agricultura-e-pesca-familiar-piaapf>
- [34] African Development Bank, 2020. African Economic Outlook 2020. Link: <https://www.afdb.org/en/documents/african-economic-outlook-2020>
- [35] International Monetary Fund – World Economic Outlook Database, October 2020. Link: <https://www.imf.org/en/Publications/WEO/weo-database/2020/October>
- [36] The graduation of Angola from the LDC category: impact of the withdrawal of international support measures GILBERTO D.F. ANTÓNIO1, ADELINO A.S. MUXITO. Link: <https://www.gradjet.org/wp-content/uploads/2018/11/ANGOLA-LDC-GRADUATION-Antonio-and-Muxito.pdf>
- [37] Global Business Reports, The Official Mining in Africa Country Investment Guide (MACIG) 2020. Link: <https://www.gbreports.com/publication/the-official-mining-in-africa-country-investment-guide-macig-2020>
- [38] Republic of Angola, 2020 - National GHG Inventory 2005-2018 (draft Nov 2020)
- [39] GIZ Repository of Adaptation Indicators, Real case examples from national Monitoring and Evaluation Systems. Link: https://www.adaptationcommunity.net/?wpfb_dl=221

Websites

- [40] Angola - Main sectors. Link: https://import-export.societegenerale.fr/en/country/angola/market-sectors?accepter_cookies=oui
- [41] Current State of Maritime Transport in Angola: http://info.afrindex.com/detail_2431/

- [42] Natural Earth Data. Link: <https://www.naturalearthdata.com/>
- [43] Angolan Banking Association. Link: <http://www.abanc.ao/en/abanc/angolan-banking-association/>
- [44] Angola - UN Country Profile. Link: <https://www.un.int/angola/angola/government>
- [45] UNFCCC – What is the Paris Agreement. Link: <https://unfccc.int/process-and-meetings/the-paris-agreement/what-is-the-paris-agreement>
- [46] Angola Sovereign Fund. Link: <http://fundosoberano.ao/>
- [47] The Economic Context of Angola, Lloyds Bank. Link: <https://www.lloydsbanktrade.com/en/market-potential/angola/economical-context>
- [48] Central Intelligence Agency – Country Profile of Angola. Link: <https://www.cia.gov/library/publications/the-world-factbook/geos/ao.html>
- [49] FAO Fishery Country Profile. Link: <http://omap.africanmarineatlas.org/BIOSPHERE/data/fishes/fisheries/CountryCatches/Fishery%20Country%20Profiles/FAO%20Fishery%20Country%20Profile%20-%20Angola.htm>
- [50] GEF. Link: <http://www.thegef.org>

ANNEX

9.1. Indicators for tracking NDC Implementation

Indicators for tracking NDC Implementation								
Indicator		2015	2020	2021	2022	2023	2024	2025
General								
Population (million)								
GDP (million USD)								
GHG Emissions								
BAU GHG Emissions (MtCO ₂ e)	Energy							
	Waste							
	AFOLU							
	Industry							
	TOTAL							
Current GHG emissions (MtCO ₂ e)	Energy							
	Waste							
	AFOLU							
	Industry							
	TOTAL							
Mitigation from NDC measures (MtCO ₂ e)	Unconditional							
	Conditional							
	TOTAL							
Mitigation from NDC measures (% change from BAU)	Unconditional							
	Conditional							
	TOTAL							
Finance								
Internal	TOTAL							
External	TOTAL							

9.2. Unconditional contributions 2030

Table 21: Unconditional Mitigation Contributions (2030)

Sector	Area	Unconditional Contributions	CO ₂ e reduction potential	% contribution for target	Cost (Million USD)
Energy	Renewable Energy	Installation of biomass plants– 500 MW	2 102,00	9,010%	1,7
		Installation of mini-hydro – 150 MW	291,30	1,249%	675,0
		Installation of hydroelectric power stations – 700 MW	2 354,24	10,091%	794,5
		Installation of large-scale solar power plants (PV) – 329 MW	504,84	2,164%	263,2
		Installation of small-scale solar panels (PV) (for example: solar villages) – 200 MW	276,20	1,184%	1 292,5
		Installation of small-scale solar panels in the industry – 4 MW	5,52	< 0,1%	25,9
		Installation of wind farms – 203 MW	546,18	2,341%	263,9
Waste	Waste	Composting of municipal solid waste– 1000 ton/day	4 136,78	17,732%	8,1
Agriculture, Forestry and Other Land Use	Forest	Reforestation – 554 000 ha	2 031,33	8,707%	831,0
Industry	Fugitive	Reduce <i>flaring</i> – 490 MMSCF/day	11 080,61	47,497%	49 000,0
Total:			23 329,00	99,98%	53 155,8

Assumptions

Biomass and hydroelectric values remained under the same assumptions as in the unconditional 2025 scenario, where for biomass the assumption is in ENAC (500 MW) and for hydroelectric the potential projects identified in the Angolan Renewable Energy Atlas are considered, in this case Cambambe 2.

The mini-hydro has remained under the same assumption as conditional 2025 scenario (150 MW).

In terms of reforestation, the total value of emissions reduction in reforestation present in INDC (2032ktCO₂e) was considered.

For flaring, the reduction target value (75%) indicated by the World Bank in 2011 was considered.

For solar and wind energy, potential projects were considered from projects identified in Renewable Energy Atlas of Angola. For solar energy, additionally to the Waku Kungo II and Lubango projects, considered in the unconditional 2025 scenario, it was also considered the Capanda project. For wind energy the projects of Quitobia and Tômbwa were considered.

9.3. Conditional contributions 2030

Table 22: Conditional Mitigation Contributions (2030)

Sector	Area	Conditional Contributions	CO ₂ e reduction potential (kt/ano)	% contribution for target	Cost (Million USD)
Energy	Renewable Energy	Installation of biomass plants– 640 MW	2 690,56	6,774%	2 173
		Installation of mini-hydro – 150 MW	291,30	0,733%	675
		Installation of hydroelectric power stations – 2 431 MW	11 278,71	28,398%	2 767
		Installation of large-scale solar power plants (PV) – 419 MW	642,94	1,619%	628,5
		Installation of small-scale solar panels (PV) (for example: solar villages) – 187 MW	258,25	0,650%	1 209
		Installation of small-scale solar panels in the industry – 6 MW	8,29	< 0,1%	39
		Solar PVs, small isolated grid, 100% solar to replace Diesel (NAMA Program) – 15 MW	20,88	< 0,1%	96,9
		Installation of solar lamps on the streets– 4000 lamps	3,11	< 0,1%	6,3
		Installation of wind farms – 409 MW	632,75	1,593%	532
	Energy Efficiency	Installation of efficient LED lamps in public buildings – 4000 lamps	0,62	< 0,1%	0,032
		Installation of efficient LED lamps in public lighting - 4000 lamps	2,71	< 0,1%	3,2
Road Transport	Natural gas buses – 4000 buses	13,18	< 0,1%	6,3	
Waste	Waste	Composting of municipal solid waste – 2000 ton/day	8 273,56	20,831%	16,3
Agriculture, Forestry and	Forest	Reforestation – 554 000 ha	2 032,21	5,117%	831,4

Sector	Area	Conditional Contributions	CO ₂ e reduction potential (kt/ano)	% contribution for target	Cost (Million USD)
Other Land Use					
Industry	Fugitive	Reduce <i>flaring</i> – 110 MMSCF/day	13 568,10	34,162%	60 000
Total:			39 717,01	99,86%	68 982,8

Assumptions

Since the ambition is extremely high, we have increased the values of all measures except for reforestation and mini-hydro, where the values remain the same as the unconditional 2030 scenario.

For biomass, hydroelectric, solar and wind power plants, potential projects were considered from projects identified in the Renewable Energy Atlas of Angola. For biomass, the projects were Luanda, Benguela/Lobito/Catumbela, Alto Catumbela, Chinguar, Cuima, Biocom, Lucapa, Luena, Luachimo, Dala, Chicapa, Lumeje and Dinge.

The program called NAMA (Nationally Appropriate Mitigation Actions), brought the opportunity for the implementation 15 MW to replace the use of diesel in three commercial farms in Angola was considered in this scenario as a small-scale solar panel.

For the hydroelectric power plants, additionally to the projects of Cambambe 2, Luime, Túmulo do Caçador and Zenza (1+2), presented in the unconditional 2030 scenario, it was also considered the Cacombo project.

For the solar energy, additionally to the projects of Waku Kungo II, Lubango and Capanga, presented in the unconditional 2030 scenario, it was also considered the Balém Dango, Lubango ii, Fútila, Chipindo, Lubango, Kuito, Gove, Waku Kungo I, Lucapa and Dungo projects.

For wind energy, additionally to the projects of Tômbova and Quitobia, presented in the unconditional 2030 scenario, it was also considered the Dunga and Quimone projects.

For the lightning and natural gas buses measures, we double the number of lamps and buses used in the conditional 2025 scenario.

In terms of flaring, we have increased the ambition to reduce flaring. Instead of 75% reduction, as planned and presented in the unconditional 2030 scenario, it is now considered a 91% emission reduction compared to 2015 emissions.

For solar panels in industry, we increased one more unit in this measure (from 4 MW in scenario unconditional 2030 scenario, to 6 MW in this scenario)

For composting, the value (1000 t/day) in the unconditional 2030 scenario has been doubled.

