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DIRECTORATE GENERAL FOR THE ENVIRONMENT AND CLIMATE

PROJECT TO SUPPORT THE IMPLEMENTATION OF THE CDN IN BENIN (PROJECT N° (PN)/ 18. 2105. 7 -001. 09)

BENIN'S UPDATED NATIONALLY DETERMINED CONTRIBUTION UNDER THE PARIS AGREEMENT

(Final document)

UNDP

coopération allemande
DEUTSCHE ZUSAMMENARBEIT

ONU environnement

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List of acronyms

AIC	:	Climate Intelligent Agriculture
ANCB	:	National Association of Benin Communes
UNFCCC	:	United Nations Framework Convention on Climate Change
CDN	:	Contribution Determined at National Level
CMEICB	:	Commission de Modélisation Economique des Impacts du Climat et de l'Intégration des Changements Climatiques dans le Budget Général de l'Etat (Commission for Economic Modelling of Climate Impacts and Integration of Climate Change into the General State Budget)
CNCC	:	National Committee on Climate Change
COP or CP	:	Conference of the Parties
CPDN	:	Nationally Determined Expected Contributions
DGEC	:	Directorate-General for the Environment and Climate
DGRE	:	Directorate-General for Energy Resources
EBT-Adaptation	:	Evaluation of the needs for Adaptation Technologies
EBT-Attenuation	:	Mitigation Technology Needs Assessment **GHG** : Greenhouse Gases
IPCC	:	Intergovernmental Panel on Climate Change
GTEC	:	Environment and Climate Thematic Group
MCVDD	:	Ministry for the Living Environment and Sustainable Development
ODD	:	Sustainable Development Goals
NGO	:	Non-Governmental Organisation
PAG	:	Government Action Programme
PANA	:	National Action Programme for Adaptation to Climate Change
GDP	:	Gross Domestic Product
PMA	:	Least Developed Countries
NAP	:	National Adaptation Plan
PND	:	National Development Plan
PRBA	:	Benin's First Updated Biennial Report
PRG	:	Global Warming Potential of greenhouse gases
PTF	:	Technical and Financial Partners
REED+	:	Reducing Emissions from Deforestation
SBEE	:	Société Béninoise d'Energie Electrique
SDAC	:	Municipal Development Master Plan
SNMO	:	National Strategy for the Implementation of the United Nations Framework Convention on Climate Change
TCN	:	Benin's Third National Communication on Climate Change
UTCATF	:	Land Use, Land Use Change and Forestry

List of chemical symbols

CO_2	:	Carbon dioxide
CH_4	:	Methane
N_2O	:	Nitrous oxide
NOx	:	Nitrogen oxide
CO	:	Carbon monoxide
NMVOCS	:	Non-methane volatile organic compounds
SO_2	:	Sulphur dioxide
BC	:	Black Carbon
OC	:	Organic carbon
PM10	:	Particulate matter PM10
PM2.5	:	PM2.5 particles
NH_3	:	Ammonia

List of units

t	:	Tonne
E $_{CO2}$	:	Carbon dioxide equivalent
MW	:	Mega Watt
MWh	:	Megawatt-hour
Mt	:	Mega tonne
Mt $_{E\text{-}CO2}$	:	Mega tonne Carbon dioxide equivalent
km² (square miles)	:	Square kilometre
ha	:	Hectare

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EXECUTIVE SUMMARY

In accordance with the relevant provisions of decision1CP/21 adopting the Paris Agreement and paragraph 22 of decision1CP/21 adopting the said agreement, Benin prepared its first Nationally Determined Contribution (NDC) and submitted it to the Convention secretariat in October 2017. The activities planned in the NDC covering the period 2017-2030 are structured into two main components, namely mitigation and adaptation. Following an assessment of the status of the NDC in relation to the actions implemented over the period 2017-2019, Benin has embarked on the process of updating this instrument with a view to raising the level of ambition set out in the NDC and providing greater clarity and transparency to ensure a better understanding of the instrument on the one hand, and better monitoring of its implementation on the other. With this in mind, Benin intends to demonstrate its firm determination to make a greater contribution to the global effort to reduce greenhouse gases. This document, the preparation of which has benefited from the broad participation of the various stakeholders, including public and private bodies, local authorities and NGOs, constitutes Benin's updated NDC.

1-NATIONAL CIRCUMSTANCES

The Republic of Benin is located in West Africa between latitudes 6°30' and 12°30' North and longitudes 1° and 3°40' East, with a surface area of 114,763 km². Benin's population is estimated at 10,008,749 (RGPH4, 2013) with an average annual population growth rate of around 3.52%. Administratively, Benin currently has twelve (12) departments subdivided into 77 Communes. Benin has two main types of climate: a sub-equatorial climate in the south and a tropical continental climate in the north. In socio-economic terms, Benin's economic situation over the period 1996-2015 was unstable, with fluctuations in Gross Domestic Product (GDP) ranging from 2 to 6% overall. However, thanks to the economic reforms currently being implemented by the public authorities, GDP reached a record 6.8% in 2018 (Source: IMF). However, per capita GDP growth remains low, due to sustained demographic growth and the poor performance of the policies implemented, leaving little scope for achieving the Sustainable Development Goals (SDGs) by 2030.

Awareness of the challenges posed by climate change has led Benin to draw up and adopt a number of policies, strategies and response programmes. In legal terms, it should be noted that a law regulating climate change in the Republic of Benin was passed by parliament on 18 June 2018 and promulgated on 06 August 2018. In terms of development priorities and objectives, the Republic of Benin has made commendable efforts, despite persistent bottlenecks and existing challenges, particularly in terms of infrastructure development, security and governance. However, the level of implementation of existing strategies is still too low to bring about significant progress towards achieving their respective visions and that of the National Long-Term Outlook Studies **"**Benin Alafia 2025**".** In terms of climate finance, Benin has set up the National Environment and Climate Fund (FNEC), accredited by the Green Climate Fund (GCF).

2- ATTENUATION

2.1. Current greenhouse gas emissions and business-as-usual projections

Benin's total GHG emissions in 2018 were around 16.94 mega tonnes of $CO2_{equivalent}$ (Mt $_{E-CO2}$), or around 1.5 tonnes $_{E-CO2}$ per capita, excluding the Land Use, Land Use Change and Forestry (LULUCF) sector. These emissions come from the energy sector (**58.09%)**, agriculture (**28.51%)**, waste (**5.38%**) and industrial processes (**1.22%**), with other sectors (vegetation fires and HFC emissions) accounting for **6.80%**. Including LULUCF, net GHG emissions amount to **9.62** Mt $_{E-CO2}$.

In terms of projections, if the business-as-usual scenario is maintained, the trend in overall emissions (excluding LULUCF) shows an increase of **71%** over the period 2018-2030, rising from **16.94** Mt $_{E-CO2}$ to **29.02** Mt E-CO2 (Figure 1). The total cumulative GHG emissions without any intervention over the period 2021-2030 are around **241.98** Mt $_{E-CO2}$ (excluding the LULUCF sector). These would come from the energy sector (**63.62%)** and agriculture (**24.04%)**, the OUI sector (**1.21%**), the waste sector **(4.64%)** and other sectors (vegetation fires and HFC emissions) (**6.49%).**

For the coming years, the measures envisaged in the revised NDC, in the Energy, Agriculture and Waste sectors (see tables 5, 6, 7 and 8 below) are likely to contribute to reducing cumulative GHG emissions (excluding LULUCF) by around **48.75** Mt $_{E-CO2}$ compared with the reference scenario, i.e. a reduction of around **20.15%** over the period 2021-2030.

2.2. Climate change mitigation targets and measures

On the basis of existing strategies, plans and programmes, the key sectoral objectives and measures for climate change mitigation are identified and set out in Tables 3 to 5.

2.3. Strategies, programmes and implementation projects

The implementation of sectoral mitigation activities (agriculture, energy, forestry and waste) under the NDC will build on existing and future strategies, programmes and projects.

3. ADAPTATION

In view of its status as a Least Developed Country (LDC), its environmental context and its development objectives, adaptation remains the priority for the Republic of Benin in terms of responding to climate change, although it adheres unconditionally to the global effort, which is geared towards the mitigation strategy.

3.1. Benin's vulnerability to climate change

The assessment of Benin's vulnerability to climate change for the purposes of the updated NDC is essentially based on the results of studies and evaluations carried out as part of the Third National Communication on Climate Change, the Technology Needs Assessment process and development programmes and projects with adaptation objectives. The major climate risks currently affecting livelihoods in particularly vulnerable sectors (agriculture, water resources, coastal areas, etc.) include flooding, drought, late and heavy rainfall, strong winds, excessive heat and rising sea levels. The impacts observed over the last three decades include lower agricultural yields, disruption of agricultural calendars, lower water levels in dams supplying drinking water due to increased evaporation of the order of 3 to 4% on an annual scale (Houngue et al. 2019), longer low-water periods (1 to 3 months), submergence of riverbanks, etc. In terms of future vulnerability, assessments based on the new climate scenarios RCP2.6, RCP4.5 and RCP8.5 (Representative Concentration Profiles) from the Intergovernmental Panel on Climate Change (IPCC), show that annual rainfall projections made at different times of the year are likely to have a significant impact on the risk of flooding.

time horizons (2030, 2050) using the CSIRO and CCCMA models, show downward or upward trends depending on the model, but the dominant features remain negative variations (MCVDD, 2019). With regard to temperatures (average, minimum and maximum), the projections reveal an overall warming trend by 2030 and 2050. Potential impacts include a rise in sea level of up to 0.81m by 2100, with the direct effects of coastal flooding and the intrusion of salt water into rivers and water tables. This could affect human settlements, health and fishing activities (MEHU, 2011). We could also expect a probable reduction in surface water run-off by 2050 across the whole of the Ouémé river basin in a scenario of reduced rainfall in the north of the country and a shift in flooding periods in the Benin section of the Niger basin, following a significant drop in the seasonal rainfall pattern (MEHU, 2011). In addition, the outlook is for a fall in maize yields (SYN 75-day variety) of around 21.6% and 28.8% respectively by 2030 and 2050, and a fall in cotton yields of around 0.9% in 2030 and 6.3% in 2050, and a prevalence of diseases, including foot-and-mouth disease, peste des petits ruminants, lumpy skin disease and the spread of ticks of the genus Rhipicephalus Boophilus microplus, high fish mortality rates and the loss of ecological habitats for fish species.

3.2. Objectives for adapting to climate change

On the basis of existing strategies, plans and programmes, the key sectoral objectives for adaptation to climate change are defined for the 2025 **and** 2030 timeframes and set out in Table 8.

3.3. Strategies, programmes and implementation projects

The implementation of adaptation activities in the eight (8) sectors considered (agriculture, water resources, forestry, coastline, tourism, energy, health, urban development and infrastructure) under the updated NDC will be based on existing strategies, programmes and projects and future programmes and projects.

4. FRAMEWORK FOR GENDER MAINSTREAMING IN THE IMPLEMENTATION OF THE CDN

Gender mainstreaming in the implementation of the NDC seems extremely important in view of the role played by certain particularly vulnerable social strata, namely women, in the fight against climate change. In this respect, the integration of the gender aspect into the updated NDC document is envisaged with a view to providing a global overview of the possibilities for taking the gender aspect into account. It therefore defines, by sector and area of action, the appropriate levels at which the gender approach should be taken into account, together with a number of recommendations.

5. INSTITUTIONAL FRAMEWORK FOR IMPLEMENTING THE CDN

Benin's updated Nationally Determined Contribution (NDC) is being implemented under the aegis of the Ministry for the Living Environment and Sustainable Development (MCVDD) acting as the national focal point for the United Nations Framework Convention on Climate Change. The main players involved include

- sectoral ministries and institutions concerned;
- local authorities ;
- private sector ;
- civil society.

The implementing bodies for this instrument are as follows:

- **The Steering Committee**, the highest decision-making and guidance body. It is made up of appointed representatives of the ministries concerned.

- **The National Coordination Unit** of the CDN is the federating body for all actions. It comprises the Director General in charge of Climate Change (DGEC), the

National Coordinator, the Focal Point for the United Nations Framework Convention on Climate Change, the Focal Point for Climate Technology Transfer, an Executive Secretary; two technical assistants to the National Coordinator.

- **Sectoral coordination** of implementation by the ministries, institutions, agencies and other structures covered by the measures/actions included in the updated NDC. They are made up of those responsible for programming and forecasting in the ministries, those responsible for monitoring and evaluating projects, the Climate Change Focal Point of the National Association of Benin Communes, and the person responsible for climate change issues in the umbrella organisation for civil society and non-governmental organisations.

- **Communal coordination,** the body responsible for overseeing the NDC at communal/local level.

Furthermore, the implementation of projects and programmes identified in the various sectors covered by the NDC is the responsibility of the ministries, institutions or sectoral entities concerned.

The necessary guidelines and facilities will be provided by the MCVDD to support sectoral structures, where necessary, in preparing applications for funding or any other initiatives through existing mechanisms. The MCVDD will also be responsible for the MNV (Measurement, Notification and Verification) system for the implementation of the NDC, and for institutional capacity-building in collaboration with the relevant stakeholders.

6. MEANS OF IMPLEMENTATION

The activities planned as part of the implementation of Benin's updated NDC require financial, technological and capacity-building resources.

As far as technological resources are concerned, the emphasis will be on endogenous technologies and South-South and North-South transfer, including the necessary know-how. The main technology transfer needs identified concern the agriculture, water resources, forestry and energy sectors (tables 14 and 15).

Capacity building will involve developing technical skills and improving institutional capabilities.

The Republic of Benin, in order to achieve its greenhouse gas (GHG) mitigation ambitions, will need an overall financial envelope of around **8556.81** million US dollars, of which **5069.03** million as a contribution from the Beninese government and the private sector and **3487.77** million to be mobilised from the international community over the period from 2021 to 2030. The cost of implementing the sectoral adaptation programmes and projects is estimated at around US$1**,796.13** million, of which the national contribution (unconditional part) is around **US$578.47** million, while the conditional part (international support) corresponds to US$1**,217.66** million. In addition, the financial resources to be mobilised for the implementation of mitigation/adaptation measures for communal projects total **162.94** million US dollars, including approximately **14.39** million US dollars for the national contribution and **148.55** million US dollars for the conditional share.
In total, the financial resources to be mobilised for the implementation of mitigation and adaptation measures under Benin's first updated NDC amount to around US$10515**.88 million,** to be provided from public funds, the private sector and international support. This amount breaks down into an unconditional contribution of around **US$5661.89** million (**53.8%) and** a conditional contribution of around US$4853**.99** million (**46.2%).**

7. CONSTRAINTS ON THE IMPLEMENTATION OF ADAPTATION STRATEGIES AND POSSIBLE SOLUTIONS

The successful implementation of the NDC could face a number of constraints, including the effective and timely mobilisation of national and external resources, the capacity of the public bodies concerned to manage large-scale programmes effectively, the effective application of regulatory texts, the effective transfer of technologies and the completion of research and development work at national level.

I. NATIONAL CIRCUMSTANCES

The Republic of Benin is located in West Africa between latitudes 6°30' and 12°30' North and longitudes 1° and 3°40' East, with a surface area of 114,763 km². It is bordered to the south by the Atlantic Ocean, to the west by Togo, to the east by Nigeria, to the north-east by Niger and to the north-west by Burkina Faso. Benin's population is estimated at 10,008,749 (RGPH4, 2013) with an average annual population growth rate of around 3.52%. The average population density is 29 inhabitants per km^2, with a higher concentration in the south of the country. Administratively, Benin currently has twelve (12) departments subdivided into 77 Communes.

Benin has two main types of climate: a sub-equatorial climate in the south and a tropical continental climate in the north. Average annual rainfall varies between 700 mm (extreme north) and 1,500 mm (extreme south-east), while air temperatures average around 27.2°C, with absolute maxima that can exceed 45°C in the north.

The last two decades have been particularly marked by an increase in climatic variability, characterised in particular by a recurrence of extreme weather phenomena (flooding in particular), disruption of seasonal rainfall patterns and an increasingly remarkable reduction in the number of rainy events. With regard to air temperature, deviations from normal (1981-2010) annual averages are fluctuating between -0.7 and -0.8 degrees Celsius.
+1,3 °C.

In socio-economic terms, Benin experienced an unstable economic situation between 1996 and 2015, with fluctuations in Gross Domestic Product (GDP) ranging between 2% and 6% overall. However, thanks to the economic reforms currently being implemented by the public authorities, GDP reached a record 6.8% in 2018 (Source: IMF). However, per capita GDP growth remains low, due to sustained demographic growth and the poor performance of the policies implemented, leaving little room for achieving the Sustainable Development Goals (SDGs) by 2030.

Climate change governance at national level is primarily the responsibility of the Ministry for the Living Environment and Sustainable Development (MCVDD), which acts as the National Focal Point for the United Nations Framework Convention on Climate Change (UNFCCC). Through the Directorate General for the Environment and Climate (DGEC), it coordinates and supervises the processes for drawing up national communications on climate change, Nationally Determined Contributions (NDCs) and other documents relating to the implementation of the Convention. It works closely with structures in other relevant ministerial departments and non-governmental organisations (NGOs).

At the political level, one of the most important instruments is the National Development Plan 2016-2025, adopted in July 2018. Awareness of the challenges posed by climate change has led Benin to draw up and adopt a number of policies, strategies and response programmes. These include: the National Strategy for the Implementation of the UNFCCC, the National Action Programme for Adaptation to Climate Change (NAPA), the National Programme for Sustainable Management of Natural Resources (PNGDRN), the Low Carbon and Climate Resilient Development Strategy, the National Strategy and Action Plan for the Sustainable Management of Benin's Mangrove Ecosystems and the NDC in particular.

On the legal front it should be noted that under climate change, a law regulating climate change in the Republic of Benin was passed by parliament on 18 June 2018 and promulgated on 06 August 2018.

In terms of development priorities and objectives, the Republic of Benin has made commendable efforts, despite persistent bottlenecks and existing challenges, particularly in the areas of infrastructure development, security and governance. However, the level of implementation of existing strategies is still too low to bring about significant progress towards achieving their respective visions and that of the "Benin Alafia 2025" National Long-Term Outlook Studies. With regard to climate finance, Benin has set up the National Environment and Climate Fund (FNEC) accredited by the Green Climate Fund (GCF).

II. ATTENUATION

2.1. Current greenhouse gas emissions and business-as-usual projections

The data on greenhouse gas (GHG) emissions are based on the results of estimates made using sectoral activity data from the TCN, which have been updated using the following tools
:

i) LEAP (Low Emissions Analysis Platform) software for the Energy and Waste sectors and the rice-growing category in the Agriculture sector;
ii) EX-ACT (EX-Ante Carbon-balance Tool) software for the agriculture sector (excluding rice growing);

In the forestry and other land use sector, the estimate of gas emissions for the reference scenario and the assessment of the mitigation scenario were carried out using the Excel spreadsheet based on IPCC guidelines, with the exception of measures to develop cashew nut and oil palm plantations, the effects of which were assessed using the Ex-act tool.

❖ **Greenhouse gas emissions (GHG) at national level**

Benin's total GHG emissions in 2018 were around 16.94 mega tonnes of $CO2_{equivalent}$ (Mt $_{E\text{-}CO2}$), or around **1.5 tonnes $_{E\text{-}CO2}$ per capita**, excluding the Land Use, Land Use Change and Forestry (LULUCF) sector. These emissions come from the energy sector (63%), agriculture (28.6%), waste (5.3%) and industrial processes (3.1%). Including LULUCF, net GHG emissions amount to 10.6 Mt $_{E\text{-}CO2}$.

❖ **Projected greenhouse gas emissions under business-as-usual scenario**

If the status quo is maintained, the trend in overall **annual** emissions (excluding LULUCF) shows an increase of around **71% over the** period 2018-2030, rising from **16.94** Mt $_{E\text{-}CO2}$ to **29.02** Mt $_{E\text{-}CO2}$. Figure 1 shows the annual GHG emissions trajectories for the agriculture, energy, waste and industrial processes sectors. Total **cumulative** global GHG emissions without any intervention over the period 2021-2030 are around **241.98** Mt $_{E\text{-}CO2}$ (excluding the LULUCF sector). Of these, **63.62%** would come from the energy sector, **24.04%** from agriculture, **1.21%** from the LULUCF sector, **4.64%** from the waste sector and **6.49%** from other sectors (vegetation fires and HFC emissions).

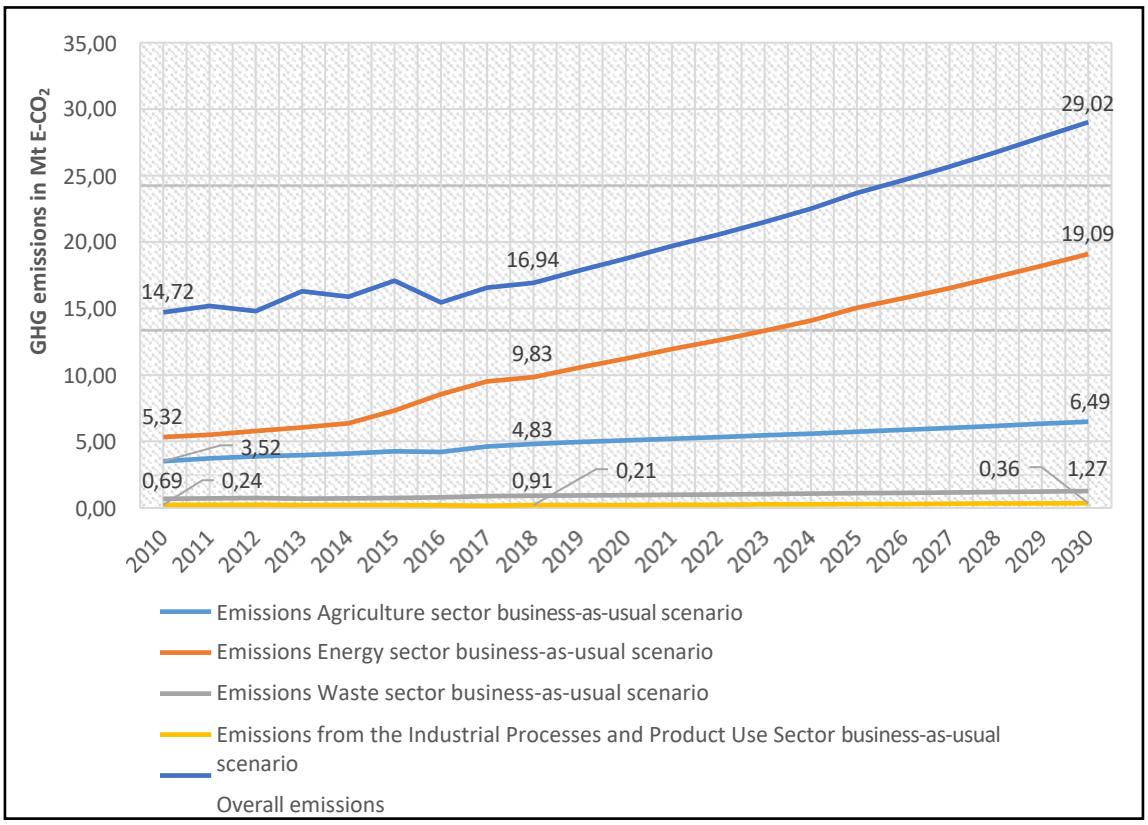

Figure 1:Trend in overall GHG emissions and emissions from the agriculture, energy, waste and industrial processes sectors, business-as-usual scenario

2.2. Historical emissions of non-GHG SLCPs and air pollutants and business-as-usual projections

Emissions for each pollutant (other than GHGs) individually between 2010 and 2018 are as follows (Table 1). The quantity of black carbon emitted into the atmosphere in Benin in 2018 is estimated at 10 thousand tonnes. The main sources of black carbon emissions are residential combustion, vegetation fires and charcoal production, as with other particulate air pollutants (Figure 2).

Table 1: Total national emissions of SLCPs (other than GHGs) and air pollutants in Benin between 2010 and 2018 (thousands of tonnes)

Pollutants	2010	2011	2012	2013	2014	2015	2016	2017	2018
Carbon monoxide	3,350	3,422	2,972	3,635	3,170	3,213	1,762	1,626	1,523
Non-methane volatile organic compounds	364.03	373.92	355.74	400.92	384.26	404.34	359.08	368.44	373.65
Nitrogen oxides	179.59	183.98	157.53	195.30	165.28	167.93	81.61	74.08	66.94
Particulate matter PM10	379.78	386.61	327.29	406.80	343.60	344.27	152.21	129.07	112.35
Sulphur dioxide	20.90	21.24	18.95	22.44	19.83	20.55	12.36	12.01	11.15
Ammonia	63.51	66.18	63.36	70.37	67.09	68.31	54.50	56.93	57.88
Particulate matter PM2pt5	257.78	262.37	223.81	276.13	235.87	236.58	110.34	95.81	85.31
Black carbon	25.17	25.63	22.26	26.99	23.42	23.57	12.51	11.31	10.42

Organic carbon	155.13	157.85	133.45	166.22	140.69	140.93	61.48	52.18	45.32

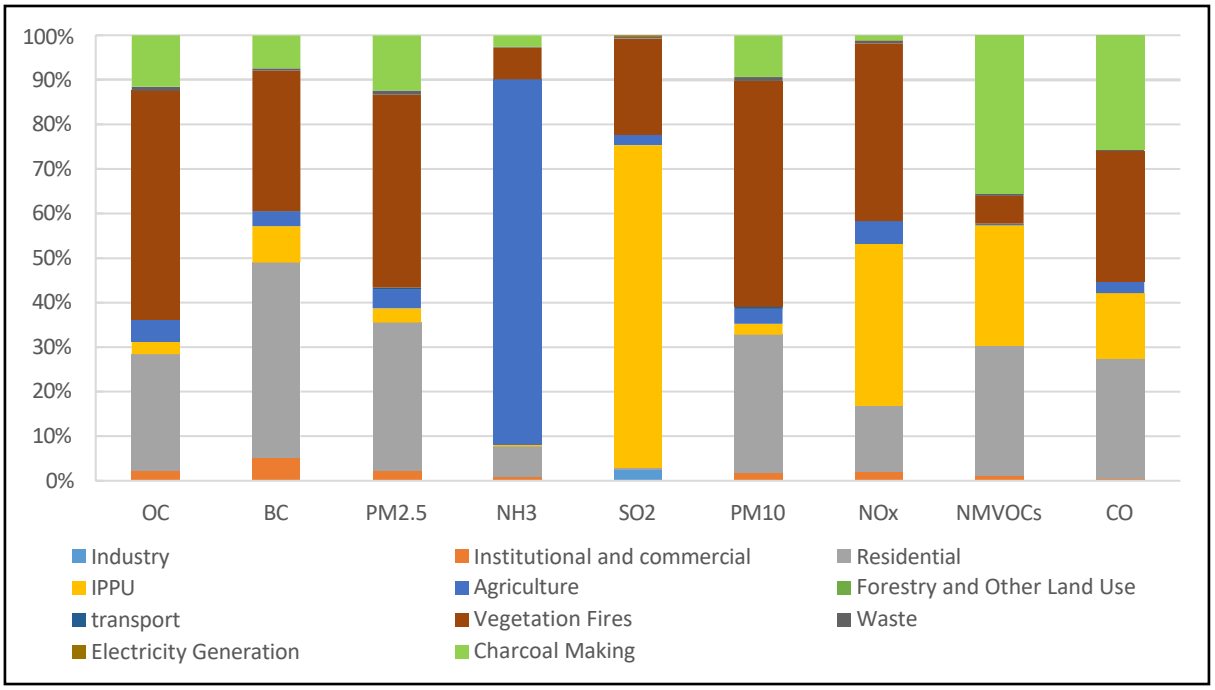

Figure 2: Contribution of different sources to SLCP (other than GHG) and air pollutant emissions in Benin in 2018 (excluding forestry and land-use change).

2.3. Actions under nationally determined contributions to mitigation

The contribution to GHG mitigation contained in the updated NDC is based on measures contained in strategies, programmes and projects for the period 2017 to 2030. This period includes the preparatory phase of implementation of the NDC (2017 to 2020) and the period of implementation of the NDC (2021 to 2030), the period during which GHG emission reduction efforts are accounted for.) Numerous opportunities for mitigating GHG emissions have been identified in the agriculture, energy and LULUCF sectors for this purpose.

❖ Actions under nationally determined contributions to mitigation

The general methodological considerations for updating the measures and the overall contribution to mitigation determined at national level are presented in Table 2.

Table 2: General methodological considerations and overall results for updating mitigation measures

Reference year	The reference year for taking into account actions contributing to GHG mitigation is 2018. However, GHG emission projections are made for the period 2019 to 2030; the emissions trajectory for the scenario without mitigation measures and the scenario with measures being the same for the period 2010 to 2016.
Type of contribution to GHG mitigation and period covered	A GHG mitigation contribution from the updated NDC is based on measures contained in strategies, programmes and projects for the period 2017-2030, which includes a preparatory phase and the start of implementation of the NDC (2017-2020) and an implementation phase of the NDC (2021-2030).
Options which the basis for discounting the NDC	Commit to further support climate action through more ambitious targets for the same period 2021-2030

GHGs considered in the contribution	Direct GHGs : Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), HFCs Other pollutants (SLCPs other than GHGs and atmospheric pollutants: black carbon, organic carbon, ammonia (NH3), PM2.5, PM10, carbon monoxide (CO), nitrogen oxides (NOx), non-methane volatile organic compounds (NMVOCs).
Sectors/sources covered by gas emissions calculations	• Energy ; • Agriculture ; • Industry and Product Use ; • Waste ; • UTCATF
Sectors/sources covered by the contribution	• Energy (sources: residential, tertiary, transport and energy industries) • Agriculture (farmland, rice paddies, burning of agricultural residues, prescribed burning of savannahs). • LULUCF (forest land including natural forests and plantations: forestry and agroforestry plantations).
Geographical coverage	The whole country
Scenarios considered for estimating gas emissions	Reference scenario: This scenario does not take into account mitigation policies and measures. • Mitigation scenario: This is the scenario based on policies and measures whose implementation period extends beyond 2021 and which contribute to mitigation. emissions or strengthening carbon sinks.
Methodology for estimating gas emissions	
Methodology for estimating emissions	For the generation of scenarios in the different sectors and sub-sectors targeted for the mitigation component, GHG emissions were estimated over the historical period from 2010 to 2016 and projections from 2017 to 2030. Four types of data were used: demographic data, macroeconomic data (GDP), sectoral activity data, emission factors and global warming potentials for the various gases. The demographic and economic data are taken from the statistics and projections of the Institut National de la Statistique et de la Démographie (INStaD). The activity data comes from official statistical documents and the databases of the various sectors concerned. Missing data and data projections have necessitated extrapolations and sometimes approximations based on hypotheses established and widely shared with stakeholders at sector level. For GHGs, the emission factors used are mostly default values from the 2006 IPCC Guidelines for National GHG Inventories. The mission factors for CH_4 from enteric fermentation and cattle manure management are specific to Benin. The emission factors for SLCPs other than GHGs and air pollutants are taken from the 2006 IPCC Guidelines for National GHG Inventories, Air Pollutant Emission Inventory Guidebook 2019 (EMEP/EEA, 2019) and Andreae and Merlet (2001). Global Warming Potentials (GWP) are values provided by the IPCC in its Fourth Assessment Report: 1 for CO_2, 25 for CH_4 and 298 for N_2O.
	Overall emissions are assessed on the basis of the sum of sectoral emissions excluding the LULUCF sector.

Methodological approach for generating the reference scenario	The reference scenario, as indicated above, is the one according to which GHG emissions are produced in the absence of actions adopted from 2017 likely to contribute to the mitigation of GHG emissions or the strengthening of carbon sinks. For this scenario, the estimated emissions for the period 2017 to 2030 are based on projections of sectoral activity data using historical trends observed from 2010 to 2017.
Methodological approach for generating the mitigation scenario	The emissions projections for 2019 to 2030 in the mitigation scenario take into account 21 measures. The total for each sector is as follows • 03 measures in the agriculture sector (table 4) ; • 12 measures totalling 20 actions to be implemented in the energy sector (table 5); • 05 measures in the LULUCF sector (table 6) ; • 01 measures in the waste sector (table 7) Of the 21 measures, only 12 are taken into account in the energy sector for SLCPs (other than GHGs) and atmospheric pollutants.
Tools for assessing emissions from the agriculture, energy, waste and industrial processes sectors	**Agriculture, energy, waste and industrial processes:** For these four sectors, the LEAP (Low Emissions Analysis Platform, 2020 version) software was used to estimate GHG emissions and assess the baseline scenario. The tools used to assess mitigation measures are : iii) LEAP for the Energy and Waste sectors and the rice-growing category in the Agriculture sector; iv) EX-ACT software for the agriculture sector (excluding rice growing); In the forestry and other land use sector, the estimate of gas emissions for the reference scenario and the assessment of the mitigation scenario were carried out using the Excel spreadsheet based on IPCC guidelines, with the exception of measures to develop cashew nut and oil palm plantations, the effects of which were assessed using the Ex-act tool.
Aggregation of emissions and emission reductions	The aggregation of GHG emissions and reductions, non-GHG SLCPs and air pollutants for all sectors was carried out using Excel.
Expected sectoral and overall emissions reductions (all targeted sectors) compared with the reference scenario	**Period from 2017 to 2019:** Based on the assessment of the implementation of the NDC during the preparatory phase, the mitigation actions undertaken in the agriculture and energy sectors from 2017 to 2019 have made it possible to reduce GHG emissions by **3.8 Mt** $_{E\text{-}CO2}$, i.e. 2.4% of the target set for 2030, which has already been achieved. In the forestry sector, the restoration of degraded natural forests and forest plantations resulted in the absorption of **1.155 Mt** $_{E\text{-}CO2}$ over the above period. Period from 2021 to 2030: For the coming years, the measures envisaged in the revised NDC, in the Energy, Agriculture and Waste sectors, are likely to contribute to reducing cumulative GHG emissions (excluding LULUCF) by around 48.75 Mt E $_{CO2}$ compared with the baseline scenario, i.e. a reduction of 20.15% over the period 2021-2030 (Table 3 and Figure 3). With regard to SLCPs (other than GHGs) and atmospheric pollutants, 12 measures have been envisaged in the Energy sector and are likely to contribute to reducing black carbon emissions by around 1.8 Mt in 2030 compared with the reference scenario, a reduction of 14.2% (Table 4)

The implementation of the mitigation measures included in this updated version of Benin's NDC supports the revision of Benin's overall GHG reduction target, namely a reduction in emissions of

emissions (excluding forestry) between 2021 and 2030 by 48.75 Mt $_{E\text{-}CO2}$ or 20.15% compared with the cumulative emissions in the reference scenario (Table 3). Figure 3 shows the trajectories of GHG emissions in each of the scenarios between 2021 and 2030: the reference scenario, the unconditional mitigation scenario (based on unconditional measures) and the overall mitigation scenario (based on unconditional and conditional measures). The mitigation measures included in each scenario are presented in tables 5, 6, 7 and 8 below. Benin also notes that the implementation of these mitigation measures, in addition to reducing GHGs, would also result in local benefits with respect to exposure to air pollution and human health by reducing emissions of short-lived climate pollutants such as black carbon, and other air pollutants harmful to health. Implementation of the mitigation measures would reduce black carbon emissions in 2030 by 14% compared to baseline black carbon emissions, as well as significant reductions in other pollutants (Table 4).

Table 3: GHG emissions and reductions (excluding forestry) for the business-as-usual scenario and the mitigation scenario (in Mt $_{E\text{-}CO2}$)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Emissions Status quo scenario	14,72	15,19	14,81	16,30	15,90	17,09	15,45	16,56	16,94	17,88	18,76
Emissions Unconditional mitigation scenario	14,72	15,19	14,81	16,30	15,90	17,09	15,45	16,56	16,94	17,82	18,52
Emissions Global mitigation scenario	14,72	15,19	14,81	16,30	15,90	17,09	15,45	16,56	16,94	17,79	18,41
Emissions reductions, Unconditional scenario										0,06	0,24
Overall emissions reductions										0,09	0,35

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Cumulative 2021-2030
Emissions Status quo scenario	19,70	20,56	21,51	22,52	23,70	24,67	25,68	26,76	27,88	29,02	241,98
Emissions Unconditional mitigation scenario	19,41	18,42	19,14	19,83	20,62	21,41	22,30	23,22	24,28	25,39	214,03
Emissions Global mitigation scenario	19,28	16,55	17,16	17,72	18,33	19,03	19,87	20,72	21,74	22,84	193,23
Emissions reductions, Unconditional scenario	0,29	2,14	2,37	2,68	3,08	3,26	3,38	3,53	3,60	3,63	27,95
Overall emissions reductions	0,42	4,01	4,35	4,80	5,37	5,64	5,81	6,04	6,13	6,18	48,75

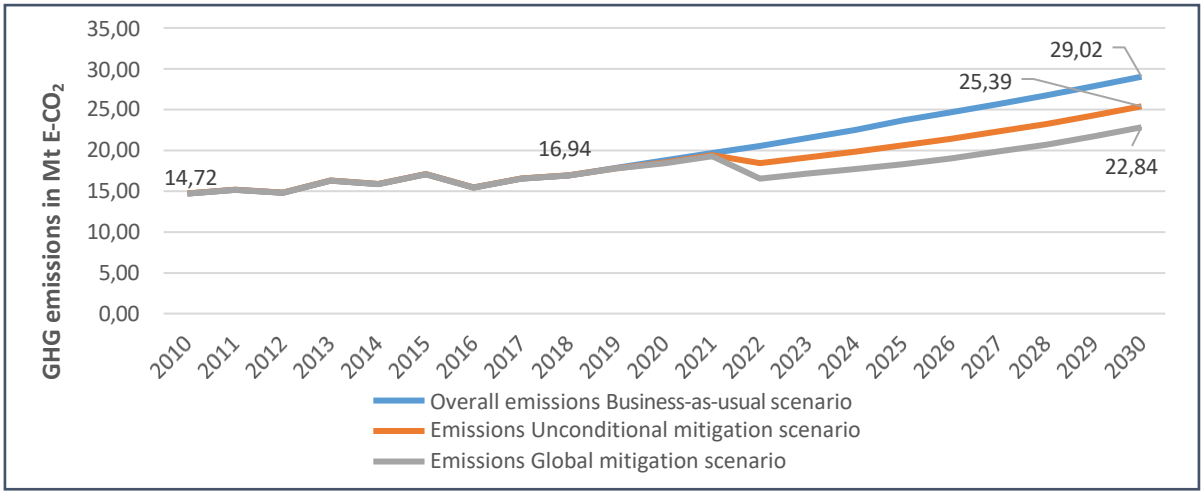

Figure 3: Trend in global GHG emissions (excluding forestry) in the business-as-usual scenario and in the intervention scenario

Table 4: Emissions of SLCPs (other than GHGs) and air pollutants in 2030 for the baseline and additional measures scenarios.

Scenario	OC	BC	PM2.5	NH3	SO2	PM10	NOx	NMVOCS	CO
2018	45.3	10.4	85.3	57.9	11.1	112.3	66.9	373.7	1,523
Base line	53.2	12.7	101.9	76.9	44.8	129.8	83.4	633.2	2,183
Attenuation	48.5	10.9	90.4	75.3	14.0	116.9	78.7	554.1	1,903
Attenuation (% reduction)	-8.9	-14,2	-11.3	-2.1	-68.8	-10.0	-5.7	-12.5	-12.8

The planned sectoral measures and their effects are presented in Tables 5, 6, 7 and 8 and illustrated in Figures 4, 5 and 6.

Table 5: Measures envisaged and emissions avoided in the agriculture sector

Sub-sector objectives	Measures envisaged	Unconditional contribution	Conditional contribution (additional)
Promoting improved cultivation techniques for crop production.	(1) Implementation of improved cultivation techniques on a plot of land. surface area of 5,000,000 ha between 2021 and 2030.	*250,000 ha/year between 2021* *and 2030*	*250,000 ha/year between 2021 and* *2030*
Promoting soil fertility management techniques for crop production.	(2) Implementation of soil fertility maintenance techniques over an area of 5,000,000 ha between 2021 and 2030.	*250,000 ha between 2021 and* *2030*	*250,000 ha between 2021 and 2030*
Promote the facilities agric ultural developments.	**(3)** Development and irrigation of rice-growing perimeters with control of water for 52,000 ha	22,000 ha of developed and irrigated rice-growing perimeters with control of water.	A further 30,000 ha of developed and irrigated rice-growing areas with water management.
Reduced emissions in t h e agricultural sector	**Expected avoided emissions: all of the above measures, i.e. the promotion of** improved cultivation techniques, the maintenance of soil fertility and the development and irrigation of rice-growing perimeters, will make it possible to avoid GHG emissions of around **29.9** Mt E-CO2 compared with the business-as-usual scenario, i.e. a cumulative reduction of **51.4%** over the period 2021 to 2030, of which **50%** is a conditional contribution and **50%** an unconditional contribution. Figure 4 below shows the trajectory of emissions in the agriculture sector for each of the scenarios and the levels that could be reached in 2030. The cumulative emissions avoided break down as follows: (1) promotion of improved cultivation techniques and (2) maintenance of soil fertility (**29.7** Mt $_{E\text{-}CO2}$ eq), i.e. **99.4%,** and (3) development of rice-growing areas with water control (**0.2** Mt E-CO2 eq). $_{CO2}$) or **0.6%.**		

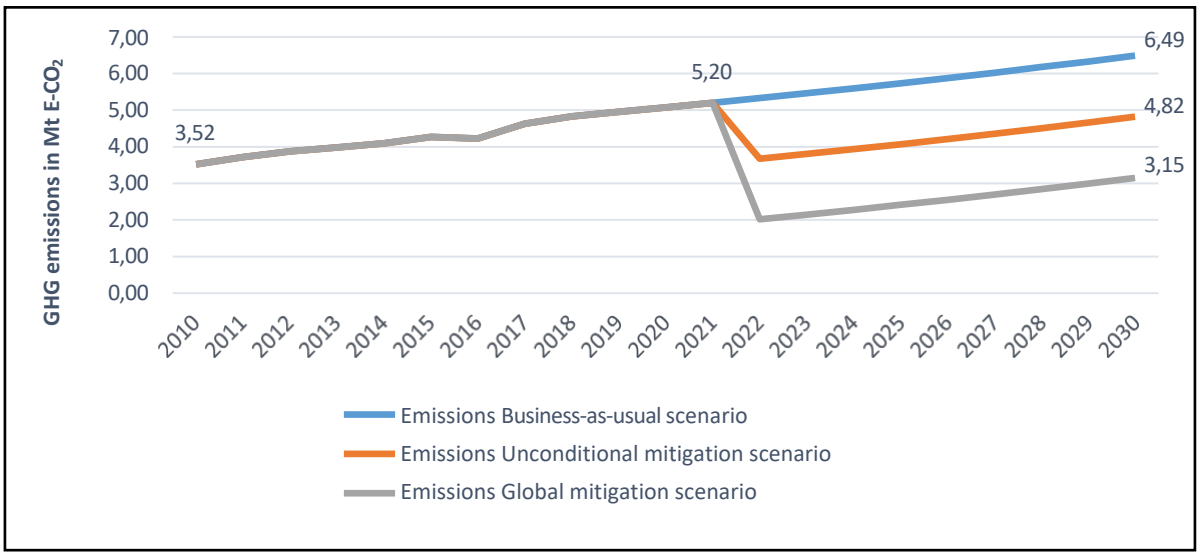

Figure 4: Trend i n GHG emissions in the case of the business-as-usual scenario and in the case of intervention in the agricultural sector

Table 6: Measures envisaged and emissions avoided in the energy sector

Objectives sub sectors	Measures envisaged	Contribution unconditional	Contribution conditional
Develop the production of electricity from natural gas and renewa ble energy sources.	(1) Construction of a floating liquefied natural gas regasification terminal (TFRG) in the port of Cotonou (total capacity of the TFRG power plants). supply: 500 MW).	60%	40%
	(2) Natural gas-fired operation of installed thermal generation capacity.	36% of total dual-fuel capacity in 2030, which could be operated with natural gas and 64% with fuel oil if the regasification terminal project is not built. 100% of capacity if the regasification unit is built. built.	
	(3) Development of renewable energies (construction of hydroelectric power stations: Dogo bis (128 MW and 337 GWh/year); Vossa (60.2 MW and 188.2 GWh/year), and Bétérou (18.8 MW and 57 GWh/year). Establishment of solar PV farms with a total capacity of 112 MWp, structuring of a sector biomass fuel 15 MW) :	Power stations hydro (electricity infrastructure and other, 51.5% of investments) + Solar 87 MW (DEFISSOL, MCA II and other) + Structuring the biomass sector 4 MW + promoting biomass-electricity 30% investment.	Hydropower plants (total civil engineering for 48.5% of investments) + Solar 25 MW + Biomass 11 MW + Biomass-electricity promotion (70%)
Extending household access to	(4) Electrification of localities by connection to the grid (approximately 2323 localities between 2021 and 2030).	Electrification of 481 localities	Electrification of 1,842 localities (planned over the period 2024-2030)

electric lighting to replace p araffin lighting. (Network connection section)	(5) Promoting access for around 1028,000 new households to domestic electric lighting and abandoning paraffin lighting in localities that will be	Acquisition of 342,000 household connection kits	Acquisition of **686,000** household connection **kits** for conventional networks (planned for the period 2024-2030)
Objectives sub-sectors	**Measures envisaged**	**Unconditional contribution**	**Conditional contribution**
	connected to the Société Béninoise d'Energie Electrique (SBEE) networks		
Continue an d strengthen the actions of efficient use of electrical energy in all sectors.	(6) (Promoting the use of low-energy electric lamps (public lighting))	Refurbishment of 18,777 conventional streetlights (250W) and replacement of of luminaires with LEDs (100W)	Installation of 30,350 new **100 W** streetlights **instead of 250 W** between 2021 and 2030
	(7) Promotion of low-energy LED lamps in households (3,000,000 lamps in 1,000,000 households (project being prepared by the European Commission). DGER)	150,000 lamps	2,850,000 lamps
	(8) Promotion of solar PV street lighting (a total of 53,743 solar streetlights, including 23,243 already installed by the end of 2020 and 30,500 new ones). street lamps to be installed for a total power **of 4,837 KW)**	Installation of 23,393 streetlights by the end of 2020 **(2105 KW)**. Rehabilitation between 2021 and 2022 of 8455 defective street lamps.	**Installation of 30,500 new solar-powered streetlights (2732 kW)**
	(9) Solar PV plants on the roofs of administrative buildings (07 health centres and colleges, 2 sites housing municipal services, 55 administrative buildings)	07 health centres and colleges and 2 sites housing municipal services	2 local authority sites 55 central government administrative buildings
	(10) Promotion of the use of low-energy electric lamps in the public services 37,221 LED lamps in public buildings	**37,221 LED lamps**	
Promote lo w energy consumption technologies wood energy	(11) Promoting the economic use of wood energy by giving 809,043 new households access to improved stoves.	270.043 new households	539.000 new households
Promote the partial substitution of wood-energy consumption with butane gas	(12) Promoting access for 275,000 new households to cooking equipment using domestic gas: by subsidising the cost of acquiring small equipment (6 kg canister + burner) by up to 30% or setting up a mechanism to facilitate access to credit for small civil servants (guarantee fund, partnership framework, etc.). with financial institutions)	100.000 new households	175.000 new households
	(13) Subsidy for consumption of domestic gas up to at least 30% of the cost of recharging	100.000 new households	175.000 new households

Extend household access to electric lighting in replacement for	(14) Promoting the extension of access by households and public services to off-grid electric lighting using individual kits (13,249 households by 2024 and 100,000 new households by 2025). households between 2025-2030).	13,249 households in By 2024 Au less 20.000 other households between 2025 and 2030	80.000 addition al households between 2025-2030
Objectives sub-sectors	**Measures envisaged**	**Unconditional contribution**	**Conditional contribution**
paraffin (off-grid electrical system component)	(15) Promoting the extension of access to infrastructure community lighting (46 health centres and 26 police stations equipped in 2019 with a total capacity of 200 kW). KWp)	46 health centres and 26 police stations	
	16) Development of rural electrification using photovoltaic solar micro power stations (239 localities + 22 localities)	202 localities, including 22 localities in commune projects	37 rural localities
Continuing and stepping up energy efficiency initiatives in all sectors.	(17) Promotion of 300,000 efficient refrigerators in households through a subsidised purchase mechanism (DGRE project in preparation with the ADB).		300,000 efficient refrigerators
Promoting energy efficiency in the transport sector	**(18)** Development of road infrastructure. Projects: North-east Cotonou bypass; Fishing road; Motorway between Sèmè Kpodji and Porto Novo. Continuation of urban road improvements in Cotonou, Porto Novo and Parakou and Calavi.	100% (public authorities)	
	(19) Drawing up and implementing a strategy and action plan to improve mobility in the medium and long term in the Greater Cotonou area and nearby towns	100% (public authorities and private sector)	
	(20) Development of river-lagoon transport (introduction of a lagoon transport service between Calavi and Cotonou, then Cotonou and Porto-Novo).	Investment for basic work (short short construction of piers)	Investment for navigation equipment, organisation and the transport service management

Reducing emissions in the energy sector	Expected avoided emissions : The implementation of these measures will contribute to reducing cumulative GHG emissions in the sector compared to the business-as-usual scenario by **18.71** Mt $CO_{2\text{-}E}$ over the period 2021 to 2030 compared to the business-as-usual scenario, i.e. a reduction of **12.15%** by 2030, including **8.4%** unconditional contribution and **3.75%** conditional contribution. Figure 5 below shows the trajectory of emissions in the energy sector for each of the scenarios and the levels that could be reached in 2030. The expected contributions by group of measures are as follows: Extension of access to electric lighting in the residential sector 7.83%; Efficient consumption of electricity in the residential sector 13.72%; Sustainable management of wood energy 20.13%; Energy efficiency in the services sector 6.9%; Energy efficiency in the transport sector 11.37%; Production of electricity using natural gas and renewable energies 30.98% and reduction of losses in electricity transmission and distribution 9.06%.

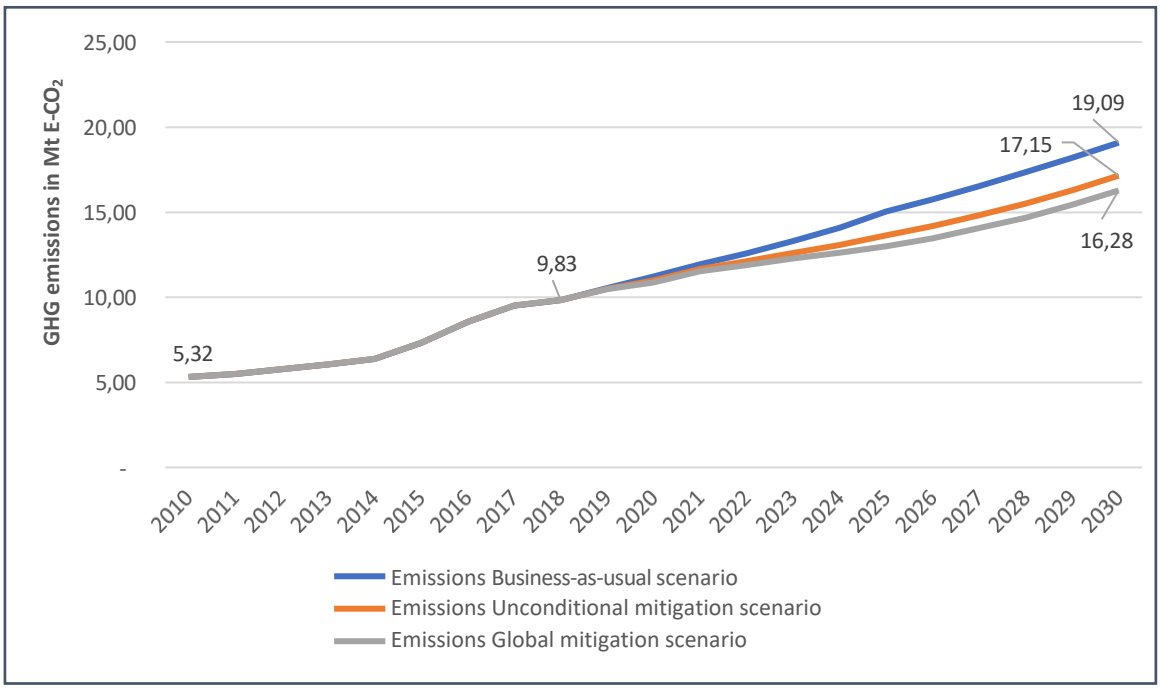

Figure 5: Trend in GHG emissions in the case of the business-as-usual scenario and in the case of intervention in the energy sector.

Table 7: Measures envisaged and emissions avoided in the LULUCF sector

Sub-sector objectives	Measures envisaged	Unconditional contribution	Conditional contribution
Increase the carbon sequestration capacity of the country's forest ecosystems by implementing sustainable management of natural forests and strengthening reforestation/planting efforts.	(1) Protection and conservation of existing natural forests and plantations to reduce and maintain the rate of deforestation at 35,000 ha/year instead of the current 60,000 ha/year.	Reduction in the rate of deforestation by 5,000 ha/year.	Additional reduction from rate of deforestation from 20,000 ha/year.
	2) Implementation of a reforestation plan with the aim of creating 15,000 ha of forest plantations per year.	Creation of 5,000 ha of forest plantations per year.	Creation of 10,000 ha of forest plantations per year.
Promoting the development of agroforestry as a means of strengthening carbon absorption capacities	(3) Improving the performance of the oil palm sector with the installation of at least 50,000 new hectares.	25,000 ha	25,000 ha (planned between 2025 and 2030)
	(4) Increase in cashew nut plantation area by 60,000 ha, including 35,000 ha over the period 2020-2026	35,000 ha	25,000 ha (planned for the 2026-2030 period)

	(5) Rehabilitation of 100,000 ha of former cashew plantations	100,000 ha	
Sub-sector objectives	**Measures envisaged**	**Unconditional contribution**	**Conditional contribution**
Reduction of emissions/reinforcement for the LULUCF sector.	**Emissions avoided/discontinued compared to business-as-usual scenario** The cumulative reductions in net GHG emissions in the forestry and other land use sector between 2021 and 2030 compared with the reference scenario are estimated at **40.64 Mt** $_{E\text{-}CO2}$, of which 37.7% will be unconditional and **62.3%** conditional. Cumulative avoided emissions over the period 2021 - 2030 break down as follows by measure: Reduction of deforestation by 25,000 ha/year and creation of 150,000 ha of forest plantations **24.53** Mt $_{E\text{-}CO2}$, or **60.3%**. Development of agroforestry (110,000 ha of new oil palm and cashew plantations and rehabilitation of 100,000 ha of old cashew plantations) **16.11** Mt $_{E\text{-}CO2,}$ or **39.7%.** Implementing these measures will also result in a nearly 3-fold increase in the net $_{CO2}$ absorption capacity of forest resources by 2030 compared with the reference scenario (-3.23 Mt to -9.68 Mt).		

Table 8: Measures envisaged and emissions avoided in the waste sector

Sub-sector objectives	Measures envisaged	Unconditional contribution	Conditional contribution
Promoting sound environmental management of household waste	Installation of an energy recovery facility at the Ouèssè household waste landfill site	100%	
Reducing emissions	The cumulative reduction in GHG emissions expected from this measure between 2021 and 2030 is estimated at 0.136 Mt $_{E\text{-}CO2}$, or 1.2% compared with the scenario without the measure.		

III. AMBITION AND FAIRNESS

The objective of reducing cumulative emissions over the period 2021 to 2030 by **20.15%** based on measures is fair in view of Benin's low contribution to global emissions, its low level of development and its socio-economic fragility. The Republic of Benin is one of the world's least developed countries, with GHG emissions estimated at around **16.93** Mt $_{E\text{-}CO2}$ in 2018, or around 1.5 tonnes $_{E\text{-}CO2}$ per capita. Its economic performance remains weak and unstable, with a critical financial situation. The average real GDP growth rate (4.7% from 2015 to 2020) is below the 7% growth rate required to sustainably combat poverty. The country is dependent on the outside world for its commercial energy supplies (petroleum products and electricity).

Benin's commitment is ambitious, given that its reduction targets cover the key sectors for its economic

development, notably the energy and agriculture sectors, whose emissions account for 91.6% of the country's total emissions. Benin's aspirations for economic development and the growth of its population will lead to a trend growth in its energy needs. As a result, GHG emissions from the agriculture and energy sectors are expected to rise steadily. One of the major challenges will be to promote low-carbon development at both sectoral and local level.

IV. ADAPTATION

4.1. Benin's vulnerability to climate change

In terms of current vulnerability, the major climate risks impacting livelihoods in the agricultural, water resources, coastal and forestry sectors are drought, flooding, late and heavy rains, strong winds, excessive heat and rising sea levels.

Over the past three decades, the climate risks mentioned above have had a number of impacts, including lower agricultural yields, disruption of agricultural calendars, lower water levels in dams supplying drinking water, longer low-water periods, flooding of river banks, etc.

In terms of future vulnerability, the climate risks to which natural and human systems could be exposed are part of a scenario of persistence or accentuation of the risks currently observed, and depend on the sector under consideration. The potential impacts, according to the climate projections for the 2025, 2050 and 2100 timeframes, range from coastal flooding and saltwater intrusion into rivers and water tables to a drop in maize yields in certain agro-ecological zones (ZAE5 in particular) and a shift in flooding periods in the Benin section of the Niger basin.

4.2. Objectives for adapting to climate change

On the basis of existing strategies, plans and programmes, the key sectoral objectives for adaptation to climate change are defined for the 2020, 2025 **and** 2030 timeframes and set out in table 9.

Table 9: Sectoral objectives for adaptation to climate change

Sectors	Main adaptation objectives
All sectors	**Horizon 2030** • To master vulnerability assessment tools and decision-making aids with a view to integrating adaptation to climate change into the planning and management instruments of national and regional institutions. • Strengthen the capacity to adapt to climate change in all socio-economic sectors (generating jobs, income, etc.). • Mobilise the financial resources needed to finance adaptation to climate change.
Agriculture	❖ **Horizon 2025** To improve the performance of Benin's agricultural sector, so that it is capable of sustainably ensuring food and nutritional sovereignty, contribute to the economic and social development of the men and women of Benin and achieve the Sustainable Development Goals (SDGs), in particular SDGs 1, 2, 12 and 13.
Water resources	❖ **Horizon 2030** • Reduce the vulnerability of natural and human systems to water stress, flooding and climate change. deterioration in water quality ; • Improving knowledge of the climate system and tools for generating climatic and hydrological information and forecasting climatic hazards; • Promoting water management and good governance.
Forestry	❖ **Horizon 2030** • Reducing the vulnerability of communities to the degradation of forest ecosystems. • Promoting agroforestry. • Developing mangrove ecosystems (characteristic coastal forest formations).
Sectors	**Main adaptation objectives**

Coastline	❖ **Horizon 2030** • Reducing the vulnerability of human settlements and resources in the coastal sector to rising sea levels sea level ; • To ensure the ongoing protection of marine and lagoon ecosystems.
Health	❖ **Horizon 2050** Contribute to sustainable improvements in the health and well-being of all people by reducing vulnerabilities, building adaptive capacity and increasing resilience to climate change
Tourism	❖ **Horizon 2025** Contribute to the reduction of negative territorial and environmental impacts by proposing consumption patterns that are more water and energy efficient, and by increasing the added value created for communities and the various players in the sector.

V. STRATEGIES, PROGRAMMES, PROJECTS AND INSTITUTIONAL FRAMEWORK OF IMPLEMENTATION

5.1. Implementation of sectoral activities

The implementation of the sectoral activities set out in the NDC will be based on existing and future strategies, programmes and projects (tables 10, 11, 12 and 13). Consequently, the relevant sectoral structures are committed to taking them into account in the design of future programmes and projects.

It should be noted that some of the mitigation projects listed in table 10 have co-benefits with adaptation and vice versa.

Table 10: Strategies, programmes and projects for preparing and implementing the NDC on mitigation in the agricultural sector

Strategies, programmes and projects	Actions to prepare and implement the CDN
A/ PROGRAMMES AND PROJECTS IN PROGRESS OR PLANNED	
SECTORAL POLICY (PDSA), PROGRAMMES AND PROJECTS IN THE GOVERNMENT'S PORTFOLIO UP TO 2025	
Rural Economic Growth Support Programme (PACER) /PADER)	Development of 405 hectares of lowlands for rice production and market gardening.
Agricultural Infrastructure Support Project in the Ouémé Valley (PAIA-VO)	Rehabilitation of hydro-agricultural schemes (i) 1,000 ha of irrigated perimeter schemes with total water control, (ii) 3,500 ha of lowlands, including around 2,800 ha of summary floodplain schemes and 700 ha of rice-growing lowlands developed in-house, (iii) 300 ha of market gardens for the women.
Support Project for Food Production in Alibori, Borgou and the Hills (PAPVIRE-ABC)	• Hydro-agricultural development: rehabilitation of 7 agro-pastoral dams (600,000 m^3) and development of 1,927 ha of irrigated areas. • Development of agricultural value chains and resilience (improving farm productivity and technological innovations, strengthening the development of agricultural value chains).
Smallholder Agricultural Productivity Improvement Programme Operators (PAPAPE)	Increasing the productivity of small farmers' rainfed and irrigated agricultural production systems (extension of management technologies, etc.). soil fertility, restoring soil health and fertility).
Project for the Development of Irrigated Perimeters in Rural Areas (PDPIM)	Hydro-agricultural development: development of 1000 ha of lowlands and 300 ha of small irrigated areas, rehabilitation of 200 ha of land. agricultural degradation, construction of four (04) water reservoirs.
Hydro-agricultural development project for the lower river valley Mono (PAHV- MONO)	Development of a 500 ha pilot area in the Mono valley.

Strategies, programmes and projects	Actions to prepare and implement the CDN
Supporting the transition to climate-smart agriculture and food systems" project (AIC)	• Sustainable intensification of productivity and growth in farm incomes ; • Reduction and/or elimination of GHG emissions ; • Creation of a favourable political and financial environment providing farmers with knowledge and access to resources and services for the transition to sustainable, productive, resilient and economically viable production systems. viable.
Soil protection and rehabilitation to improve food security project (ProSOL)	• Sustainable soil protection and rehabilitation approaches implemented on a large scale in Benin • 30,000 to 50,000 ha of land are protected or rehabilitated
Project to support the sustainable development and integrated management of hydro-agricultural areas (PAVPHA)	• Contribution to sustainable income improvement, food and nutritional security for family farms and employment for young people and women.
Project for food security through the development of lowlands and the strengthening of storage capacities in Benin (PSAAB)	• Hydro-agricultural development of 2,300 ha of low-lying rice fields (2,000 ha) and gardens (300 ha)
National Programme for the Development of the Oil Palm Sector	Improving the performance of the oil palm sector by planting at least 25,000 new hectares and improving average yields by at least 20% by 2025.
Strategic development plan for the agricultural sector	Improving the productivity and production of plant products from priority agricultural sectors
Building resilience to climate change and improving food and nutritional security for vulnerable populations	• Agricultural innovations for climate change resilience and mitigation (promotion of climate-smart agriculture), extension and support for the implementation of production systems that limit GHG emissions); • Sustainable management of land and aquatic ecosystems.
Low-carbon development strategy carbon-intensive and resilient to climate change	Strengthening the resilience of farming communities and sectors
Food security and building resilience (PROSAR) GIZ	• Improving the food situation of people vulnerable to malnutrition, particularly women of childbearing age and young children,
Project to strengthen the resilience of vulnerable populations and ecosystems in the Ouémé catchment area to climate change through AIC and the sustainable management of land and water resources.	• Extension of agricultural innovations for climate change resilience and mitigation (Promotion of AIC) • Extension and support for the implementation of production systems that limit GHG emissions • Promoting sustainable management of land and aquatic ecosystems • Development of the Ouémé catchment areas
Agricultural diversification support project (PADA)	To contribute to the economic growth of agriculture in Benin by improving the productivity of rural households and increasing the national supply of quality agri-food products. Strengthen the productive capacities of the project's beneficiaries in the rice sector and promote a favourable environment for rice production. capable of supporting the development of the agricultural sector.
Project to support agro-ecological transition in the cotton-growing areas of Benin, phase 2	Contributing to the fight against poverty among vulnerable populations; improving food and nutritional security, and strengthening the resilience of family farms to the effects of climate change
Integrated programme to adapt to climate change through the development of agriculture, river transport and tourism in Benin's Niger valley (UNDP)	Development of agricultural and pastoral systems (construction of five (05) multi-purpose dams with development of 500 ha of irrigated perimeter downstream, rehabilitation of seven (07) hydro-agricultural dams, development of 200 ha of low-lying areas with partial water control, development of 500 ha of flood recession perimeters, construction of four (04) flood water spreading sills for the perimeters recession).

Strategies, programmes and projects	Actions to prepare and implement the CDN
B/ PROGRAMMES TO BE DRAWN UP AND IMPLEMENTED	
A programme to strengthen actions in Benin's departments in the areas of soil fertility management, promotion of improved cultivation techniques and crops that are resilient to climate change (see proposal for the development of the programme in the appendix to the report on the updating of the NDC).	
Programme to promote hydro-agricultural schemes for rice cultivation with water control (see proposal for drawing up the programme in the appendix to the report on updating the NDC).	
C/ PROJECTS INITIATED BY LOCAL AUTHORITIES (PROJECT DOCUMENTS TO BE DRAWN UP ON THE BASIS OF THE AVAILABLE FACT SHEETS)	
Community Development Plans	
Municipality of Pobè	Project to develop 1,000 hectares for rice production and market gardening in the commune of Pobè
Municipality of Pobè	Project to create a community dynamic offering greater resilience to the effects of climate change in the Commune of Pobè
Commune of Bantè	Project to restore degraded soils in the commune of Bantè
Commune of Adja-Ouèrè	Project to develop five hundred (500) hectares of rice-growing lowlands in the commune of Adja-Ouèrè

Table 11: Strategies, programmes and projects to prepare for and implement the NDC on mitigation in the energy sector

Policies, strategies, programmes and projects	Actions to prepare and implement the CDN
A/ PROGRAMMES AND PROJECTS IN PROGRESS OR PLANNED	
SECTORAL POLICY, PROGRAMMES AND PROJECTS IN THE GOVERNMENT PORTFOLIO	
Increase the capacity of natural gas-fired electricity generation	• Construction of new oil/gas-fired power stations • Construction of a new 143 MW gas-fired power station
Developing renewable energies and energy efficiency" project	• Construction of the Dogo -bis hydroelectric power station (128 MW and an expected output of 337 GWh/year) • Construction of the Vossa hydroelectric power station (60.2 MW and an expected output of 188.2 GWh/year) • Construction of the Bétérou hydroelectric power station (18.8 MW) • Installation of photovoltaic solar farms: Detailed information is provided below. • **Benin Programme for the Millennium Challenge Account (MCA II)** electricity generation project (installation of 4 solar power plants to be connected to the SBEE grid, with a total capacity of 50 MW). • DEFISSOL project (Construction and operation of a 25 MW power plant) • Project to build a 25 MWp solar power plant with AFD financing • Structuring the biomass-fuel sector: use of agricultural waste (potential of 15 MW). The sites : • Developing photovoltaic street lighting • Promoting access to solar PV kits for households in isolated regions • Implementation of the UNDP Green New Deal Programme to support Benin in developing renewable energies and strengthening the resilience of the energy mix to climate change.
Controlling energy consumption" project	• Introduction of binding standards to reduce energy consumption • Energy-saving pilot projects in administrative buildings ((i) installation of solar PV plants with storage on the main administrative buildings, (ii) efficient air conditioning and (iii) LED lighting (on at least 5 administrative sites) • Street lighting: replacement of energy-guzzling bulbs with LED low-energy bulbs; • Street lighting with solar street lamps • Energy efficiency in households
Electrification projects in urban and rural areas	• Kandi-Banikoara HV line construction project • Electricity Grid Extension and Densification Project (PEDER): 44,219 new households to be connected to the grid • Project to Restructure and Extend SBEE's Distribution System (PRESREDI): 10,000 new households to be connected • Project to restructure and extend SBEE's networks in Abomey-Calavi and the Atlantic Department (PRERA): (i) Densification and extension of urban and peri-urban networks and (ii) electrification of 82 rural localities. • Sustainable and secure access to electricity project (PADSBEE 2019-2025): Reinforcement and extension of transmission networks and extension of distribution networks over 500 km in several urban and peri-urban localities (34). • Projet d'Amélioration de Services Energétiques (PASE): (i) 8,000 LED lamps for public lighting; (ii) supply of equipment to connect 75,000 new households. • Programme Spécial d'Extension et de Renforcement des Réseaux Electriques du Bénin (Benin PROSPER2E): Electrification of 1,122 localities: 369 urban and peri-urban localities and 753 rural localities. Connection of • PROVES solar energy development project (8 localities remaining for the grid connection component)
Policies, strategies, programmes and projects	**Actions to prepare and implement the CDN**

	• Regional Programme for the Development of Renewable Energies and Energy Efficiency PRODERE 2 under WAEMU funding • RERE FORSUN and PROMER projects • Programme d'actions pour l'électrification des localités rurales au Bénin (PAELRB): (i) electrification of 200 rural localities by connection to the SBEE electricity network (phases 2 and 3); (ii) connection to the network of at least 60,000 new households. • Renewable Energy and Energy Efficiency Development Project (DEREE): (i) installation of solar equipment + AEV system as part of the pilot phase of the Energy and Water for Life programme; (ii) installation of solar water heaters in health centres; (iii) carrying out energy audits in 20 public administrations; (iv) promotion of improved stoves; (v) installation of low-energy lamps in 400 public establishments in 20 communes in Benin. • Rural Electrification Project (PERU): (i) network extension in 76 peri-urban localities in 20 communes; (ii) electrification of 100 new localities in 11 of the country's 12 departments; (iii) connection to the conventional network of at least 41,000 new rural households.
Benin Programme for Millennium Challenge Account (MCA II)	• Electrical distribution project • Off-grid electricity access project.
B/ SECTORAL PROGRAMMES AND PROJECTS TO BE DRAWN UP AND IMPLEMENTED	
Rural electrification projects	Programme of actions to reinforce the electrification of rural localities under the CDN (electrification of at least 720 new localities by 2030 (see proposal for drawing up the programme appended to the report on the work). CDN update).
Projects to promote low-energy wood technologies	• Promoting the economic use of wood energy by giving **809,043** new households access to improved stoves. • Support for the organisation and development of internal markets for the manufacture and marketing of efficient cooking equipment (improved stoves using wood energy; butane gas cooking equipment).
Programme to continue and step up actions to promote energy efficiency	• Setting standards, implementing regulations, supporting the organisation and development of a market for low-energy electrical equipment (lamps, air conditioners, refrigerators, freezers) and other electrical equipment. • Introduction of the obligation to take energy efficiency into account in public orders for electrical equipment and in the construction of public buildings (definition of specific specifications, interministerial order, etc.). • Widespread installation in public administration buildings of devices for automatically switching off lighting and air conditioning when office users are absent. • Development of information and awareness campaigns on the benefits of energy savings and the performance of energy equipment, with the aim of encouraging changes in behaviour. • Development/extension of initiatives to promote public lighting using LEDs or solar-powered streetlights. • Implementation of a support programme to improve energy efficiency in the industrial and tertiary sectors.
C/ PROJECTS INITIATED BY LOCAL AUTHORITIES (PROJECT DOCUMENTS TO BE DRAWN UP ON THE BASIS OF THE AVAILABLE FACT SHEETS)	
Community Development Plans	
Commune of Dassa-Zoumè	Projects to promote climate change mitigation measures at household level and the promotion of renewable energies and energy-efficient stoves and pressure cookers in the commune of Dassa-Zoumé
Policies, strategies, programmes and projects	**Actions to prepare and implement the CDN**

	Project to supply part of the buildings of the Dassa-Zoumé town hall with solar energy (supply of part of the loads of the town hall premises with PV solar energy on the roof).
Municipality of Pobè	Electrification project for 04 localities in the Commune of Pobè (GBANAGO, Onigbolo Village, Otèkotan and Igbo-Ocho) by connection to the existing HTA network, offering greater resilience to the effects of climate change (promoting household access to electric lighting).
Commune of Bantè	Solar energy electrification project for the Town Hall offices

Table 12: Strategies, programmes and projects for preparing and implementing the NDC on mitigation in the forestry sector

Policies and strategies, programmes and projects	**Actions to prepare and implement the CDN**
A/ PROGRAMMES AND PROJECTS IN PROGRESS OR PLANNED	
(1) SECTORAL POLICY, PROGRAMMES AND PROJECTS IN THE GOVERNMENT PORTFOLIO	
Programme of intensive reforestation of the national territory through incentives	• Carrying out, maintaining and monitoring silviculture: a total of 20,000 ha of plantations and/or enrichment in classified forests and reforestation areas is expected. • Carrying out, maintaining and monitoring silviculture: a total of 800 ha of private and communal plantations are expected to be planted. • Creation, maintenance and silvicultural monitoring: a total of 700,000 linear metres of avenue planting in urban and peri-urban areas are expected to be planted • Creating green spaces in towns: a total of 300 green spaces expected • Implementation of a system for monitoring and protecting forests against bush fires and transhumance
PAGEFCOM 2: Communal Forest Management Support Project, phase 2	• Improving forest cover: a total of 600 ha of forest plantations, 20 ha of plantations in schools and 20 ha of cashew nut plantations are expected. • Promoting non-timber forest products ; • Developing the blue economy in forests ; • Support for economic alternatives to forestry ;
Riverine Forest and Land Management Programme, additional phase	• Financing alternative income-generating activities ; • Protection and monitoring of old plantations; • Management of state-owned plantations.
Strengthening the energy sector's resilience to the impacts of climate change in Benin (PANA) Energy)	Introduction of sustainable land and forest management practices to strengthen the resilience of wood-energy production areas.
Promoting the sustainable production of biomass electricity in Benin.	Adoption of best practice in land use and sustainable forest management (sustainable management of forests and land by restoring 3,000 ha of land and forest plantations, and the establishment of 2,000 ha of plantations to provide biomass, improvement of farming techniques on more than 9,000 ha through the adoption of best land use practices).
Classified Forests Project Benin	Creation of 15,000 ha of wood-energy plantations and 7,000 ha of teak plantations
Produced by the Office National du Bois	• *Restoring natural forests* • *New forest plantations: An average of 500 to 600 ha per year*
Other DGEFC activities contributing to the National Reforestation Campaign	• *Tree planting during the commemoration of the various Days celebrated* • *Other reforestation and forest plantation projects carried out by forestry inspectorates*
(2) Low Carbon and Climate Resilient Development Strategy (2016-2025): strengthening carbon sinks and reducing emissions from deforestation and forest degradation.	
Strengthening carbon sinks and reducing greenhouse gas emissions	• Implementation of large-scale afforestation programmes • Setting up the various components of the REDD+ programme
emissions from deforestation and forest degradation forest degradation.	• Drawing up and implementing sustainable management plans for forest ecosystems

(3) National vegetation fire management strategy in Benin	
Improving controlled management of wildfires	• Implementation in forestry policy (controlled wildfire management option) • Drawing up appropriate guidelines and controlled wildfire management plans. • Regulation of the use of fires in natural areas to be conserved, agricultural areas, grazing areas, woodland areas, etc... defined in the Municipal Development Master Plans (SDAC) • Development of cross-border and international partnerships to help manage major fires.
(4) Integrated strategies to promote private wood-energy plantations in Benin	
Benin's space agenda	
Ensuring sustainable management of forest resources	• Design and implementation of participatory development plans; • Restoration of degraded forest areas ; • Setting up a system to monitor and protect forest areas using modern tools; • Promoting the sustainable development of the timber and wood-energy sectors • Sustaining conservation and protection initiatives • Design and implementation of a development programme for agricultural areas in conjunction with the preservation of natural areas
B/ SECTORAL PROGRAMMES AND PROJECTS TO BE DEVELOPED AND IMPLEMENTED	
Restoration of degraded forests and creation of forest plantations	• Large-scale reforestation programme with the aim of achieving 15,000 ha of forest plantations per year. • Continuation and intensification of actions to replace wood energy by promoting access for 275,000 new households to small-scale gas cooking equipment butane.
Reinforcement of actions in protection and conservation	Programme to step up action to protect and conserve natural forests and plantations (2021-2030).
C/ PROJECTS INITIATED BY LOCAL AUTHORITIES (PROJECT DOCUMENTS TO BE DRAWN UP ON THE BASIS OF THE AVAILABLE FACT SHEETS)	
Community Development Plans	
Municipality of Pobè	Project to create a community dynamic offering greater resilience to the effects of change
Commune of Bantè	Project to improve forest resource management in the commune of Bantè
	Project to reduce population pressure on classified forests
Municipality of Bonou	Protection and rehabilitation of ecological reserves (biodiversity) along the Ouémé River
Municipality of Pobè	Project to create a community dynamic offering greater resilience to effects of change
Communes of Ouèssè, Tchaourou, Savè	Creation of a green belt along the Okpara and Ouémé rivers in the communes of Ouèssè, Tchaourou, Savè on 3000 ha (pilot phase 1000 ha)
Commune of Dassa-Zoumè	Project to plant fast-growing forest species for wood energy production

Table 13: Sectoral strategies for implementing adaptation objectives

Sectors	Strategies for implementing adaptation objectives
	A/ STRATEGIES AND PROGRAMMES AT SECTORAL LEVEL
All sectors	• National Strategy for the Implementation of the United Nations Framework Convention on Climate Change (SNMO) • National Climate Change Adaptation Plan (NAP) • National Development Plan (currently being drawn up by MPD) • Government Action Programme (PAG) • Strategy for strengthening human resources, learning and skills development to tackle climate change
Agriculture	• Strategic Development Plan for the Agricultural Sector (2017-2025) • National strategy for the provision of effective and efficient agrometeorological services to the agricultural sector • Training strategy for farmers, livestock breeders and fishermen on technologies adapted to climate change and the use of agro-meteorological information • Communication strategy to build stakeholders' capacity to adapt to climate change for agricultural production and food security in Benin • National agricultural investment and food and nutritional security plan (2017-2021) • Strategic Development Plan for Climate-Smart Agriculture (2018-2022)
Water resources	• National Action Plan for Integrated Water Resources Management (PANGIRE) • National strategy for drinking water supply in rural Benin • National strategy for urban drinking water supply in Benin • Master Plan for Water Management and Development in the Ouémé Basin
Forestry	• National Programme for the Sustainable Management of Natural Resources • Capacity-building strategy on vegetation fire management for better adaptation to climate change • Strategic development plan for mangrove ecosystems • Strategic Plan for the Development of Non-Timber Forest Products
Coastline	• LAW No. 201 8-10 of 02 July 2018 on the protection, development and enhancement of the coastal zone in the Republic of Benin; • Report on the State of the Marine Environment in Benin • Create and make operational the Observatory for Coastal Monitoring and Coastal Risk Control • Multisectoral plan for adaptation to coastal risks in the face of climate change in Benin
Energy	• Strategic plan for the development of the energy sector up to 2025. • Master plan for the development of the electrical energy sub-sector in Benin (2016-2035). • National Renewable Energy Development Policy for Benin - Horizon 2035.
Health	• Cholera containment plan 2017-2021 • National Health Policy (PNS 2018-2030) • National Health Development Plan 2018-2022 • National Community Health Policy -horizon 2025
Tourism	*National Tourism Policy (NTP 2013-2025)*
Urban planning and infrastructure	Horizon 2025 • Improving the quality of life • Controlling urban development • Reforesting towns and cities • Ensuring the preservation of road assets and improving their management • Developing the national network of roads and tracks
	B/ PROJECTS INITIATED BY LOCAL AUTHORITIES

Sectors	Strategies for implementing adaptation objectives
(PROJECT DOCUMENTS TO BE DRAWN UP ON THE BASIS OF THE AVAILABLE FACT SHEETS)	
Community Development Plans	
POBE Agriculture	Project to develop 1,000 hectares for rice production and the cultivation of produce market gardeners in the commune of Pobè
BOUKOMBE Agriculture (	Project to support sustainable agriculture for food and nutritional security by the promoting economically promising local sectors.
KANDI Agriculture	Project to support the development of market garden crops and strengthen the resilience of market gardeners in the Communes of Alibori (PADCMCA)
KARIMAMA Agriculture	Project to Support the Development of Vegetable Crops and Strengthen the resilience of market gardeners in the commune of Karimama (PADCMCK)
KLOUEKANME Agriculture	Project to improve the resilience of maize, cowpea, tomato and chilli growing systems in Klouékanmè Commune
KARIMAMA Agriculture	Project to Support the Development of Vegetable Crops and Strengthen the resilience of market gardeners in the commune of Karimama (PADCMCK)
MALANVILLE Agriculture	Construction of three (03) water reservoirs and five (05) fish ponds in the municipality of Malanville
MALANVILLE Agriculture	Strengthening the coping capacities of flood victims in the municipality of Malanville
KARIMAMA Agriculture	Strengthening the coping capacities of flood victims in the municipality of Karimama
AGBANGNIZOUN Agriculture	Identify and promote food crops that are resilient to climate change and train farmers in modern cultivation techniques adapted to the effects of climate change. Climate change (PDC project)
SAVE Agriculture	Development and securing of agro-pastoral and fishing areas
OUAKE Agriculture	Strengthening the capacity of market garden producers to adapt and remain resilient in the face of climate change. irregular rainfall in the commune
	Adapting agricultural and construction systems to climate change
OUAKE Agriculture	Strengthening the adaptation and resilience capacities of rice and coffee producers fish in the face of irregular rainfall
ZAKPOTA Agriculture	Integrated soil fertility management project and techniques for adapting to climate change climatic
ADJA-OUERE Agriculture	Construction of water reservoirs for rice growers in Houéli gaba, Dagbla and de Massè
GRAND-POPO Urban planning and infrastructure construction	Project to strengthen the municipality's resilience to the effects of climate change
OUAKE Urban and rural infrastructure development Construction	Project to adapt homes to climate change
PARAKOU Sanitation	Creation of a sewage sludge treatment and solid waste management site

5.2. Framework for mainstreaming gender in the implementation of the NDC Updated

This table 14 has been incorporated into the NDC with a view to providing a global overview of the possibilities for taking gender into account in the implementation of the NDC. It defines the appropriate levels of gender mainstreaming by sector and area of action, together with a number of recommendations.

Table 14: Indicators of gender mainstreaming in the implementation of the updated NDC

Sectors	Mitigation measures/ adaptation projects	Indicated level of gender mainstreaming	Gender mainstreaming indicator	Recommendations for implementing the updated CDN
Agriculture	Implementation of sustainable land management techniques (improved cultivation techniques, maintaining the fertility of rice-growing soils with water management, etc.)	- Targeting potential beneficiaries for the extension of agricultural techniques -Training for farmers - Provision of various forms of support for the application of sustainable land management techniques -Capacity building for small farmers -Choice of beneficiaries for the various adaptation projects identified - Technological development and farm advisory services - Access to finance -Managing soil sustainability	Percentage of women farmers agriculture taken into account Percentage of women farmers who have benefited from technical and financial support measures	• As far as possible, ensure the involvement of women farmers in the implementation of actions to promote sustainable land management techniques. • Monitor and evaluate the level of involvement of women
	Sector adaptation projects involving farmers and rural communities			
UTCATF	• Protection and conservation of natural forests and plantations through reforestation. • Development of agroforestry	- targeting beneficiaries for private plantations - Training the project management team - Identification phase of programme beneficiaries Training the project management team - Identification phase of beneficiaries in adaptation projects for forestry stakeholders	-Number of projects and programmes for the protection and conservation of natural forests and plantations run by women - Percentage of women involved in projects to protect and conserve natural forests Percentage of women and men targeted for reforestation who have benefited from technical and financial support measures	- Ensure that women are involved in the protection and conservation of natural forests as part of the programmes and projects developed for this purpose. - Regularly monitor the development and implementation of reforestation projects to ensure that, as far as possible, the gender aspect is taken into account.
	Projects to adapt the forestry sector by improving the living conditions of people living near forest areas forestry and the development			
Sectors	**Mitigation measures/ adaptation projects**	**Indicated level of gender mainstreaming**	**Gender mainstreaming indicator**	**Recommendations for implementing the updated CDN**

	management rational of natural resources.			
ENERGY	• Promoting the economic use of wood energy by providing access to to 809,043 new households with improved stoves à subsidised prices • Promoting access to 275,000 new households to have access to small-scale cooking equipment using domestic gas (6 kg canister + burner) by subsidising the cost of acquisition by up to 30% or setting up a mechanism to facilitate access to credit for small civil servants (guarantee fund)	• Targeting households for sales of improved stoves at subsidised prices • Targeting households for the distribution of domestic gas cooking equipment at subsidised prices	Percentage of women who benefited from improved stoves at subsidised prices Percentage of women who benefited from domestic gas cooking equipment at a subsidised price	Ensure that equipment is available in all areas targeted for distribution Ensure that the distribution mechanism put in place does not limit women's access to equipment. Ensuring that the equipment is adopted by women
Other sectors (Water Resources Coast, Tourism, Health ;	• Adaptation projects involving the promotion of integrated water resource management • Adaptation projects involving the protection and conservation of coastal areas • Adaptation projects involving populations with health conditions vulnerable to climate change	Targeting the beneficiaries of project activities	Rate of women taken into account in project implementation Rate of women benefiting from support measures technique and financial for adapt to climatic constraints	- Gender aspect taken into account in all adaptation projects and programmes relating to the implementation of the NDC. - Strengthening adaptation project or programme teams to take account of the gender aspect when setting up and during the implementation phase.

5.3. Institutional framework for implementing the updated NDC

Benin's updated Nationally Determined Contribution (NDC) is being implemented under the aegis of the Ministry for the Living Environment and Sustainable Development (MCVDD) acting as the National Focal Point for the United Nations Framework Convention on Climate Change. The main players involved include

- sectoral ministries and institutions concerned;
- local authorities ;
- private sector ;
- civil society.

The implementing bodies for this instrument are as follows:

- **The Steering Committee**, the supreme decision-making and guidance body. It is made up of appointed representatives of the ministries concerned.

- **The National Coordination Unit** of the CDN is the federating body for all actions. It comprises the Director General in charge of Climate Change (DGEC), the National Coordinator, the Focal Point of the United Nations Framework Convention on Climate Change, the Focal Point for Climate Technology Transfer, a Management Secretary and two technical assistants to the National Coordinator.

- **Sectoral coordination** of implementation by the ministries, institutions, agencies and other structures covered by the measures/actions included in the updated NDC. They are made up of the people in charge of programming and forecasting in the ministries, the people in charge of monitoring and evaluating projects, the Climate Change Focal Point of the National Association of Benin Communes, and the person in charge of climate change issues in the umbrella organisation for civil society and non-governmental organisations.

- **Communal coordination,** the body responsible for overseeing the NDC at communal/local level.

Furthermore, the implementation of projects and programmes identified in the various sectors covered by the NDC is the responsibility of the ministries, institutions or sectoral entities concerned.
The necessary guidelines and facilities will be provided by the MCVDD to support sectoral structures, where necessary, in preparing applications for funding or any other initiatives through existing mechanisms. The MCVDD will also be responsible for the MNV (Measurement, Notification and Verification) system for implementation of the NDC, and for institutional capacity-building in collaboration with the relevant stakeholders. The organisational structure for implementing the updated NDC is shown in Figure 6 below.

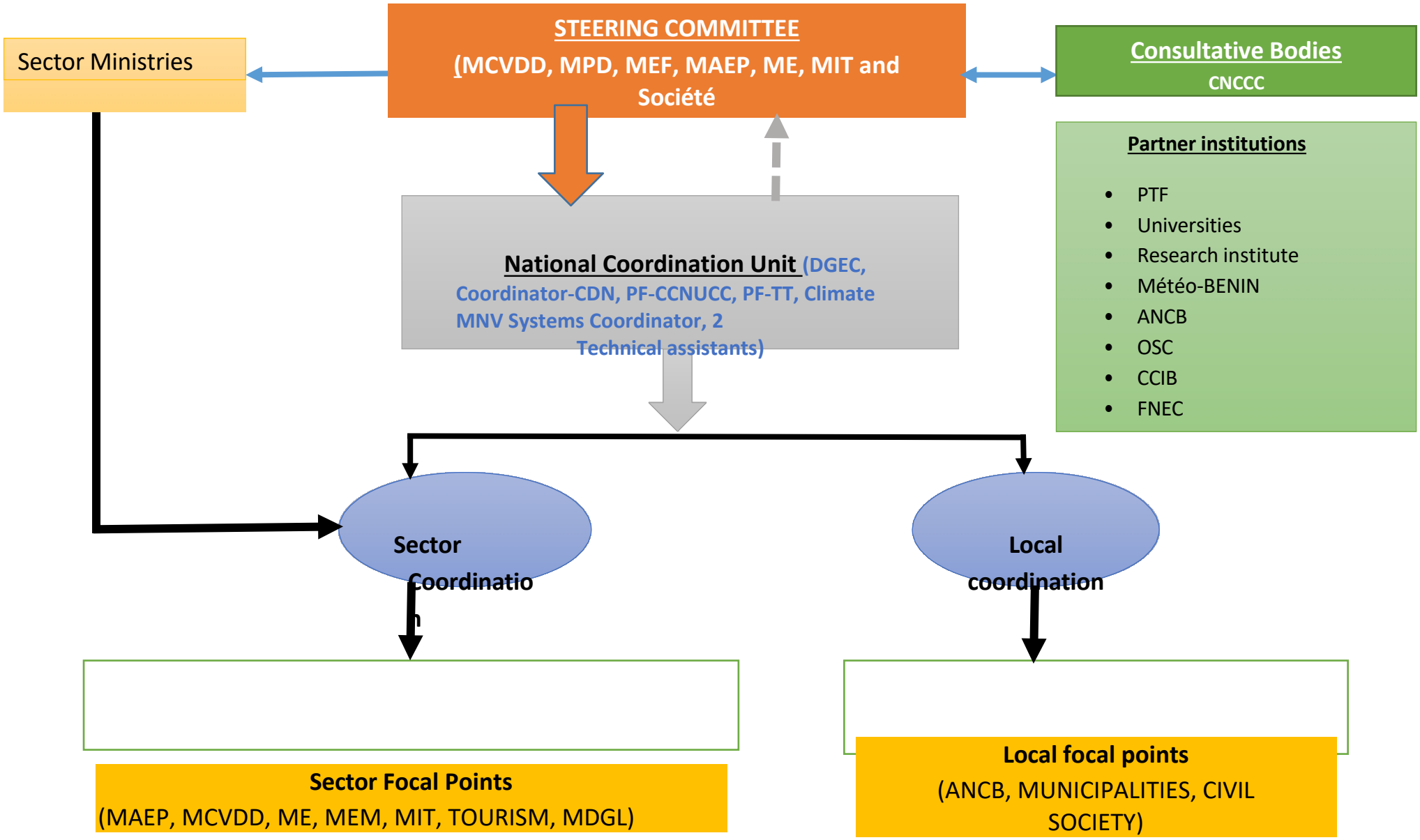

Figure 6: Framework of the *institutional arrangement for implementing the NDC*

VI. MEANS OF IMPLEMENTATION

The implementation plan for Benin's updated NDC is presented in Appendix 3. The implementation of these activities requires financial, technological and capacity-building resources.

6.1. Technology transfer needs

The needs expressed in terms of technology transfer for the ADAPTATION and Mitigation Component stem mainly from the assessments carried out as part of the Third National Communication (MCVDD, 2019) on climate change (October 2019) and the report on priority adaptation technologies, drawn up as part of the Technology Needs Assessment-Technology Action Plan Project (TNA-Adaptation, 2020 & TNA_Mitigation, 2020).They cover the agriculture and water resources sectors for the adaptation component and the agriculture, forestry and energy sectors for the mitigation component (see tables 15 and 16).

Table 15: Adaptation technology transfer needs

Sector	Priority technologies for adaptation by sector	Objectives	Benefits
Agriculture	Development and dissemination of technical itineraries adapted to the new climatic constraints in the agro-ecological zone 5	• Reduce vulnerability or improve resilience to recurring long dry spells in the area • Sustainably increase agricultural yields to ensure food and nutritional security • Improving the performance of cropping systems to combat food insecurity in the long term	To combat food insecurity and, by extension, poverty by creating the conditions for improving farmers' incomes and living conditions.
	Mulching	• Reduce water loss through evaporation • Protecting the soil from wind and water erosion • Providing nutrients for crops	Protect the soil from wind and water erosion. - Improve infiltration of rain and irrigation water by maintaining good soil structure. - Keep the soil moist by reducing evaporation. - Nourish and protect soil organisms. Plant mulch is an excellent source of carbon for soil organisms and provides conditions conducive to their growth. - Block the growth of weeds. - Prevent soil heating. - Provide nutrients for crops. - Increase soil matter content. soil organic matter.
	Integrated management of agriculture and agropastoral livestock farming	• Increase agricultural and livestock productivity • Ensuring food self-sufficiency for local populations • Increasing soil fertility • Improving crop productivity over the long term	Create a framework conducive to bushfire management, conservation of biological diversity (soil microbial fauna), reduction in the use of agricultural inputs, increased purchasing power for farmers, consolidation of the social fabric between livestock farmers and farmers.
Sector	**Priority technologies for adaptation by sector**	**Objectives**	**Benefits**

Water resources	Development of small watersheds to improve food and nutritional security for vulnerable populations	• Combating flooding in agricultural areas around watercourses and lakes • Ensuring the availability of water for agricultural purposes Implement actions for the sustainable use of water resources	• Promotes the regeneration of soil fertility • Improvement or stabilisation of annual water flows • Optimum management of hydrological risks (low water levels, flooding, etc.) • Improving water management • Diversification of agricultural production
	Integrated management of lowland rice fields	• Improving the productivity of agricultural land and the efficiency of water use in rural communities • Increase rice production capacity in the long term • Promoting sustainable intensification of rice production systems by introducing innovative practices into cropping systems • Help develop a sustainable system for producing and distributing quality rice seed of improved varieties Creating socially acceptable cropping systems acceptable and economically viable farming systems in rice-growing areas to help achieve food security	Benefits associated with promoting this technology: hydro-agricultural development for water control; diversification of rice and fish farming activities to increase yields and income; development of a dynamic process of consultation and participation by local stakeholders organised and mobilised around water management; development of concerted actions for innovation and land solutions; increase in agricultural production; management of rainwater; etc.
	Multi-purpose drilling	• Guaranteeing the continuous and sustainable availability of drinking water • Ensuring the quality of drinking water at all times • Ensuring the supply of drinking water to peri-urban areas • Improving access to water supply services in rural areas • Ensure access to drinking water for the entire rural and semi-urban population Reduce the suffering of the population due to the lack of water, especially during the dry season,	The multiple-purpose drilling technique offers advantages such as: rational water management; reduction in water-borne diseases and in the number of morbidité cases, mainly among children; reduction in the drudgery of collecting water; increased availability of water per inhabitant; development of income-generating activities; job creation; improved school enrolment rates, especially for girls in rural areas.

It should be noted that technology transfer needs for other sectors may be assessed at a later date and included in future editions.

Table 16: Mitigation technology transfer requirements

Sector	Priority technologies for adaptation by sector	Objectives	Benefits
Agriculture	Integrated soil fertility management	• By the end of the year, implement techniques to maintain the fertility of the soil.	Organic-based ISFM techniques require less cash than the use of mineral fertilisers. They can therefore more easily be applied to poor households. ISFM techniques
Sector	**Priority technologies for adaptation by sector**	**Objectives**	**Benefits**

		soils over an area of at least 5,00,000 ha	are farming practices/activities that must be carried out each year/season, etc. Agricultural yields can increase with the implementation of ISFM techniques. Yield increases can range from 50 to 100%. This technology will also reduce GHG emissions in the agricultural sector.
	Manure production and use technology.	Promoting the technology and use of manure by farmers	This technology will reduce N2O emissions from chemical fertilisers in agricultural soils. GHG emissions attributable to pressure on forests in search of new land will also be reduced.
Forestry	Reforestation of forest land	Increase the carbon sequestration capacity of the country's forest ecosystems by creating 15,000 ha of forest plantations per year over the period 2021 to 2030.	The soil in reforested areas will be protected. The plant cover improves the microclimate and leaves the environment. Reduced degradation of forest cover. Strengthening carbon sequestration through rapid reforestation.
	Small equipment butane gas cooking equipment	Promote access to small-scale gas cooking equipment for at least 275,000 new households between 2021 and 2030	Controlling demand for wood energy. Preserving forest heritage and its capacity to absorb CO_2.
Energy	Efficient refrigerators and air conditioners	Promote the purchase of 300,000 refrigerators and freezers in households and service sector establishments by 2030. 300,000 efficient air conditioners	Contributes to the efficiency of electricity consumption, controlling electricity demand and thus reducing greenhouse gas emissions.
	Solar PV street lighting	Promoting solar energy in street lighting	Photovoltaic solar energy is clean energy with no direct GHG emissions.
	Bus-boats for river-lagoon transport and associated infrastructure (landing stages) ;	Set up a river-lagoon transport service on the Calavi- Cotonou and Porto Novo - Cotonou routes with the aim of diverting at least 30 of current road traffic in the same directions. Achieving this objective will require a fleet of 20 water buses, each with at least 217 seats.	A reduction in specific diesel consumption per person and per km of around 6 to 7 times compared with small diesel vehicles. And a reduction in fuel consumption at sector level compared with individual or small-group transport. A proportional reduction in specific CO2 emissions. A reduction in fuel consumption
	Light diesel-electric trains for intercity transport and rehabilitated Ouidah-Cotonou-Porto-Novo rail network	Promote a rapid interurban transport service using light diesel-electric trains on the Ouidah-Pahou-Godomey-Cotonou and Porto Novo-Cotonou routes. Achieving this objective will require a transport fleet of at least 4 trains, each made up of a set of two locomotives and 8 passenger carriages.	A considerable reduction in fuel consumption in the transport sector compared with transport by small four-wheel vehicle. Consequently, a proportional reduction in specific CO2 emissions. Reduction in local air pollution in Cotonou

6.2. Capacity building

Capacity building will consist of developing skills and improving institutional capabilities (table 17).

Table 17: Capacity-building needs.

Priority sectors/areas	Capacity-building needs
Climate Observation and Monitoring System	Setting up a reliable climate observation and monitoring system for the entire climate system, including the Earth, Ocean and Atmosphere components.
	Reinforcement of air pollution measurement stations.
	Setting up capacities for monitoring and forecasting atmospheric fluctuations and changes, early warning systems and assessment of socio-economic and environmental impacts, etc.
Institutional framework	Strengthening current structures operating in the field of protection of the atmosphere, land and oceans.
	Creation or reinforcement of structures dealing with adaptation issues.
	Creation or reinforcement of structures dealing with mitigation issues.
	Defining national climate plans and strengthening the consideration of climate change in development programmes/strategies
Agriculture	Integration of climate change issues into agricultural development policies, plans and programmes.
	Training for rural development stakeholders (managers, technicians, producers, local authorities) on the issue of climate-agriculture relations.
	Support for the adoption of improved sustainable land management technologies
	Use of agro-climatology models (capacity building in agro-climatic risk modelling, familiarisation with DSSAT and SARRAH software, etc.).
	Popularising local knowledge of agro-climatic risk and crisis management.
	Monitoring and evaluation of agricultural and hydro-agricultural development projects.
	Training for supervisors and growers in production systems for the main food crops, incorporating integrated soil fertility and moisture conservation techniques.
Energy	Promoting and improving access to renewable energy sources in order to safeguard forest resources and reduce people's vulnerability to the effects of climate change.
	Support for the organisation and development of markets for efficient cooking equipment (improved stoves, gas cooking equipment).
	Training public and private players and users in renewable energy systems.
	Capacity building on energy saving initiatives and measures in different sectors (domestic, industry, services).
	Adoption of labels and standards for efficient lamps and household electrical equipment.
	Introduction of energy performance standards for improved stoves (this action is being carried out by the DGRE's Projet d'Amélioration des Services Energétiques (PASE))
	Introduction of regulations and measures to promote a market for low-energy refrigerators using non-CFC hydrocarbons. (DGRE/MCA Benin 2)
	Carrying out a survey on the penetration rates of improved stoves and gas cooking equipment, refrigerators, air conditioners, energy-saving lamps, and household energy consumption (country as a whole)
	Carrying out a survey of fuel consumption by vehicle category and use
Water resources	Strengthening the ability of the decentralised services of the Directorate-General for Water to forecast risks and manage hydro-climatic crises.
	Building capacity to take account of climate change issues in water resource management policies.
	Training technical managers in the field of the vulnerability of water systems to climate change and on the methodology for studying the vulnerability of water resources to climate change.
	Development of integrated water resource management projects under conditions of climate change.

Priority sectors/areas	Capacity-building needs
	Hydro-climatic modelling (hydrological functioning of catchment areas, hydrogeological functioning of aquifers, saline intrusion processes in wellfields in the coastal zone).
Forestry/ Biodiversity	Setting up units to deal with climate change issues as they relate to biodiversity.
	Taking climate change issues into account in the management of biological resources.
	Training of stakeholders (decision-makers, technicians, farmers, local authorities) in the development of integrated projects for the conservation of biological resources in a modified climate and in ex situ and in situ conservation methodology.
	Popularising local knowledge of biological resource management.
	Setting up information and warning systems on the harmful effects of climate change on biodiversity
	Making the most of traditional knowledge of the climate-biodiversity relationship.
	Preparation and dissemination in local languages of laws and regulations relating to biodiversity management.
	Making the most of traditional knowledge of biological diversity to strengthen carbon sequestration sinks.
Human settlements	Integration of climate change issues into political and strategic plans, development programmes and projects.
	Training and information for stakeholders (decision-makers, health workers, local populations, local authorities) on the harmful effects of climate change
	Protecting socio-economic systems against degradation of the coastal environment and rising sea levels.
	Building capacity at various levels to interpret and communicate relevant climate information and advise local communities.
	Strengthening the institutional and technical capacity of the government, civil society organisations and communities to assess local risks and vulnerabilities, and to formulate plans and action plans. climate-sensitive development policies.
	Promoting practical solutions for adapting to climate variability and the future risks of climate change.
	Promoting the strengthening and sharing of knowledge on climate change, through awareness-raising activities, risk management and the development of gender-sensitive policies.
Health	Training health professionals on climate change and its impact on health.
	Setting up a monitoring and information system on the impact of climate change on health.
Tourism	Strengthening technical expertise in assessing vulnerability and adaptation to climate change in the tourism sector
	Setting up a warning, monitoring and information unit on the impact of climate change on the tourism sector
Communication about CDNs	Strengthening the team responsible for managing, monitoring and disseminating NDC actions/activities Strengthening the capacity to monitor and evaluate adaptation activities in the various sectors. Media training on the issues, challenges and opportunities of NDCs. Establishment of a periodic consultation framework to monitor the implementation of the NDC.

6.3. Financing

National resources (public funds and private investment) will be supplemented by external financial support (bilateral or multilateral). The total estimated cost of implementing the plans, programmes and projects included in Benin's updated NDC is US$10515**.88** million, of which US$5661**.89** million is unconditional and US$4853**.99 million** conditional (annexes 1 and 2). Of this total, the cost of local community projects included in the updated NDC is estimated at US$162**.94** million, with an unconditional portion of US$14**.39** million and a conditional portion of US$1.9 million.

148.55 million (Appendix 3). This estimate is based on the country's current experience in implementing climate change mitigation and adaptation projects.

In order to measure the progress made in implementing these activities, a Measurement, Notification and Verification (MNV) system will be set up at the MCVDD in conjunction with the other ministries and communes involved in the CDN.

6.4 Conditions for successful implementation of CDN

Successful implementation of the NDC will depend on the following conditions:

- Effective and timely mobilisation of national resources and of the aid expected from the international community. Difficulties in mobilising sufficient resources could hamper the implementation of projects.
- The capacity of the public bodies concerned to manage large-scale programmes effectively. In order to prevent any difficulties arising from the lack of capacity of these structures, a proper diagnosis of staffing requirements for the timely implementation of projects will have to be carried out at sector level, as part of the development of the institutional capacity-building programme provided for in the NDA.
- The effective implementation of regulations and control of the national market for imported electrical equipment and household appliances, and the success of operations to promote energy efficiency.
- The capacity of the agricultural sector to effectively promote improved cultivation techniques on the planned areas.
- The effectiveness of technology transfer and the completion of research and development work at national level.
- Rigorous monitoring of a master plan for the implementation of the updated CDN at the level of the coordination team on the one hand and in all the sectoral ministries concerned on the other.

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APPENDICES

Annex 1: Summary of mitigation measures under the nationally determined planned contributions

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
AGRICULTURE SECTOR							
Promoting improved cultivation techniques for crop production.	Implementation of improved cultivation techniques over an area of 5,000,000 ha between 2021 and 2030.	50%	136,5	50%	136,5	273	MAEP
Promoting soil fertility management techniques for crop production.	Implementation of soil fertility maintenance techniques over an area of 5,000,000 ha between 2021 and 2030.	50%	463,89	50%	463,89	927,78	MAEP
Promoting hydro-agricultural development.	Development and irrigation of rice-growing areas with water control of 52,000 ha compared with the level reached in 2020	50%	141,82	50%	141,82	283,64	MAEP
		50,0%	**742,21**	**50,0%**	**742,21**	**1484,42**	
ENERGY SECTOR							
Developing the production of electricity from gas and renewable energy sources.	Construction of a floating terminal for the regasification of Liquefied Natural Gas (LNG) in the port of Cotonou (total capacity of the power stations to be supplied: 500 MW).	60% private investment	138	40%	92	230	

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
	Natural gas-fired operation of installed thermal generation capacity.	36% of the total dual-fuel capacity in 2030, which could be operated with natural gas and 64% with fuel oil if the regasification terminal project is not built. The 100% of capacity if the regasification plant is built.					ME/SBEE
	Develop renewable energies (construction of hydroelectric power stations: Dogo bis (128 MW and 337 GWh/year); Vossa (60.2 MW and 188.2 GWh/year), and Bétérou (18.8 MW and 57 GWh/year). Establishment of solar PV farms with a total capacity of 112 MWp (DEFISSOL 25 MW, MCA II 50 MW, additional 25 MW and others), structuring of a biomass fuel industry (15 MW), promotion of sustainable biomass-electricity production.	Power stations hydro (electricity infrastructure and other, 51.5% of investments) + Solar 87 MW (DEFISSOL, MCA II and other) + Structuring the biomass sector 4 MW + promoting biomass-electricity 30% investment.	942,00	Hydropower plants (total civil engineering, 48.5% of investments) + Solar 25 MW + Biomass 11 MW + promotion biomass - electricity (70%)	846,73	1788,73	ME/SBEE
	Implementation of the UNDP Green New Deal Programme to support Benin in the development of renewable energies and strengthening the resilience of Benin's energy mix to climate change			100%	160	160	ME(SBEE)
	Climate and energy issues are integrated into the CDPs (Implementation of the CEMAATERR 2 project). Climate and Energy: Adaptation and Mitigation Measures in Rural Areas)			100%	0,26	0,26	Communes

Extend household access to electric lighting to replace paraffin lighting (grid connection component).	Electrification of localities by connection to the grid (around 2323 localities between 2021 and 2030)	Electrification of 481 new localities through various projects underway or starting up (PRERA, PROVES, PAELRB, PERU). (i.e. 22.63%)	228,14	Electrification of 1842 localities (PROSPER 2E and PIERL programmes). (i.e. 77.36%)	143,39	371,53	ME (SBEE and ABERME)

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
	Restructuring, reinforcement and extension of MV and LV networks and connection projects in urban and suburban areas	Reinforcement and extension of networks through various projects at in progress or beginning (PRESDERI, PADSBEE-BADEA/FSD, FORSUN, PADSBEE-VINCI, PEDER, PROMER, RERE, KANDI-BANIKOARA line)	734,93			734,93	ME (SBEE)
	Promoting access for some 1028,000 new households to domestic lighting using electricity and abandoning paraffin lighting in localities to be connected to the Société Béninoise d'Energie Electrique (SBEE) networks	Acquisition of 342,000 household connection kits, i.e. 33% of households	52,85	Acquisition of 686,000 household connection kits for conventional networks (planned for the period 2024-2030), i.e. 67% of the total.	106,02	158,87	ME (SBEE)
Continuing and stepping up initiatives to promote efficient use of electricity in all sectors.	Promoting the use of low-energy electric lamps (public lighting)	Refurbishment of 18,777 conventional streetlights (250W) and replacement with LEDs (100W) (i.e. 38.2%)	8,42	Installation of 10,935 new conventiona l streetlights **with 100 W** LEDs **instead of 250 W** between 2021-2030 (i.e. 61,8%)	5,90	14,32	ME (ABERME)
	Promotion of low-energy LED lamps in households (3,000,000 lamps in 1,000,000 households (project being prepared by the DGRE)	150,000 lamps (i.e. 5%)	0,75	2,850,000 lamps (i.e. 95%)	14,22	14,96	ME (DGRE and SBEE)
	Promotion o f solar PV street lighting (in total 53,593 solar-powered streetlights, including 23,243 already installed by the end of 2020 and 30,500 new streetlights to be installed for a total capacity **of 4,837 KW**	Installation of 23,393 streetlights by the end of 2020. Refurbishment of 8,455 streetlights between 2021 and 2022. (i.e. 21.7%)	12,79	30,350 new street lamps solar. (i.e. 78.3%)	75,42	88,20	ME (ABERME)
	Solar PV plants on the roofs of administrative buildings (07 health centres and colleges, 2 sites housing municipal services, 55 administrative buildings)	07 health centres and colleges, 2 sites housing municipal services	0,24	2 local authority sites 55 central government administrative buildings	1,87	2,11	ME (ABERME)

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
	Promoting the use of low-energy electric lamps in public services 37,221 LED lamps in public buildings	37,221 lamps (i.e. 100%)	0,17			0,17	ME (ABERME)
Promote low wood consumption technologies-energy	Promoting the economical use of wood energy by giving **809,043** new households access to improved stoves.	**270,043 new households. (i.e. 33.3%)**	0,88	539,000 new households. (i.e. 66.7%)	1,76	2,65	MCVDD (DGEFC) and (ME (DGRE)
Promote the partial substitution of wood energy consumption by butane gas	Promoting access for **275,000 new households** cooking equipment using domestic gas by subsidising the cost of purchasing small equipment (6 kg canister + burner, up to **33%**)	100,000 new households. (i.e. 36.4%)	1,82	175,000 new households. (i.e. 63.7%)	3,18	5	MCVDD (DGEFC) and (ME (DGRE)
	Subsidy for domestic gas consumption of 150 FCFA/kg in the first year, decreasing by 15% each year to a minimum of 57 FCFA/kg.	100,000 new households. (i.e. 36.4%)	17,64	175,000 new households. (i.e. 63.6%)	30,86	48,50	MCVDD (DGEFC) and (ME (DGRE)
Extend household access to electric lighting to replace paraffin lighting (off-grid electricity system component)	Promoting the extension of access by households and public services to off-grid electric lighting **using individual kits** (**13,249 households by 2024 and 100,000 new households between 2025 and 2030**).	13,249 households by 2024. And at least another 20,000 households between 2025 and 2030. (i.e. 29.4%)	1,93	80,000 households between 2025-2030. (i.e. 70.6%)	11,64	13,56	ME (ABERME)
	Promoting the extension of access to off-grid electric lighting for social and community infrastructures (46 health centres and 26 police stations equipped in 2019 with a total capacity of 200 KWp)	46 health centres and 26 police stations. (i.e. 100%)	2,36			2,36	ME (ABERME)
	Development of rural electrification using solar photovoltaic micro power stations (239 localities + 22 localities)	202 localities, including the 22 localities in commune projects. (i.e. 84.5%)	88,79	37 rural localities. (i.e. 16%)	14,67	103,45	ME (ABERME)

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
	Promotion of 300,000 efficient refrigerators and 300,000 efficient air conditioners in households through a subsidised purchase mechanism.			300,000 refrigerators and 300 000 efficient air conditioners (100%)	69,09	69,09	ME (DGRE)
Promoting energy efficiency in the transport sector	Development of road infrastructure. Projects : - North-east Cotonou bypass (40km) - Fishing road phase II. Motorway between Sèmè Kpodji and Porto Novo. Further development of urban roads in Cotonou, Abomey-Calavi, Porto Novo and Parakou.	100% (public authorities and private partners)	1483,64			1483,64	MIT (DTT)
	Development of river-lagoon transport (introduction of a lagoon transport service between Calavi and Cotonou, then Cotonou and Porto-Novo).	Private investment for navigation equipment, organisation and management of the transport service. (i.e. 16%)	17,7	Investment for basic works (dredging of watercourses, construction of piers). (i.e. 84%)	93,03	110,73	MIT DTFL)
	Drawing up and implementing a strategy and plan for transport within and between Cotonou, Porto-Novo and Parakou, with a view to impacting on the consumption of petroleum products in the transport sector.	Strategy and action plan (100%)	0,93			0,93	MIT and ME (DGRE)
	Improving fuelwood carbonisation yields	Project to support the improvement of carbonisation for sustainable forest management	0,09				MCVDD (DGEFC)
		Continuation of awareness-raising and training initiatives to encourage the adoption of improved carbonisation technology (2023-2030) with the aim of achieving 50% of coal production by 2030. (50% unconditional)	6,55	50%	6,55	13,09	MCVDD (DGEFC) and ME (DGRE)
		69,1%	**3740,60**	**30,9%**	**1676,57**	**5417,17**	

FORESTRY SECTOR	

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
Reduce the rate of deforestation to no more than 35,000 ha/year instead of the current 60,000 ha/year	Reinforcing actions to protect, conserve and sustainably manage classified forest resources (setting up a monitoring system, strengthening the intervention capacities of the Technical Forest Management Units, organising and monitoring conservation series, replanting, improving and promoting the rural timber market system, sustainable management of transumance, etc.).	Implementation of actions planned under the Benin Classified Forests Project (50%)	75,00	Implementation of other similar projects to protect classified forests (50%)	75,00	150,00	MCVDD (DGEFC)
	At least 2,500,000 ha of forests in the protected area are to be protected, conserved and sustainably managed.	Developing and implementing projects to support the sustainable management of natural resources in the protected area (40%)	88,03	Additional projects to support the sustainable management of natural resources in the protected area (60%)	132,04	220,07	MCVDD (DGEFC) and the municipalities
	Reinforced monitoring of forest plantations (120,000 ha)	Implement measures to monitor 60,000 ha of former forest plantations (50%) over the period 2023 to 2030	31,74	Implement measures to monitor an additional 60,000 ha of old forest plantations (50%) over the period 2023 to 2030	31,74	63,47	MCVDD (DGEFC) and municipalities
Increase the carbon sequestration capacity of the country's forest ecosystems by strengthening reforestation/planting efforts	Implementation of a reforestation plan with the aim of creating 15,000 ha of forest plantations per year (i.e. 150,000 ha by 2030).	Pursue ongoing initiatives (PRI projects, PAGEFCOM 2, etc.). reforestation by the ONAB and other actions of the National Reforestation Campaigns: An average of 5,000 ha of forest plantations per year, i.e. 50,000 ha by 2030. (33,3%)	274	Creation of 10,000 ha of additional forest plantations per year, i.e. 100,000 ha by 2030. (66,7%)	548	822	MCVDD (DGEFC) and municipalities

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
Promoting alternative activities to logging for the benefit of rural communities (10 to 20% of the cost of new reforestation projects)		30%	49,32	70%%	115,08	164,40	MCVDD (DGEFC)
Promote th e development of agroforestry as a measure to strengthen carbon absorption capacities	(3) Improve the performance of the oil palm sector by planting at least 50,000 new hectares.	25,000 ha (50%)	19,09	25,000 ha (planned between 2025 and 2030) (i.e. 50%)	19,09	38,18	MAEP
	(4) Increase cashew nut plantation area by 60,000 ha, including 35,000 ha over the period 2020-2026	35,000 ha (58%)	1,75	25,000 ha (planned for the period 2026-2030). (i.e. 42%)	1,75	3,49	MAEP
	(5) Rehabilitation of 100,000 ha of former cashew plantations.	100,000 ha (100%)	18,45			18,45	MAEP
		37,66%	**557,37**	**62,34%**	**922,69**	**1480,06**	
WASTE SECTOR							
Promoting sound environmental management of household waste	Installation of an energy recovery facility at the Ouèssè household waste landfill site	100%	0,96	0%	0	0,96	MCVDD
	Providing Benin's municipalities with controlled landfill sites	50%	10,00	50%	10	20	MCVDD and the Communes
		52,3%	**10,96**	**47,7%**	**10**	**20,96**	
INSTITUTIONAL AND REGULATORY CAPACITY BUILDING AND OTHER SUPPORT MEASURES							

Organise the workshop to launch the implementation of the CDN		100%	0,04	0%	0	0,04	MCVDD

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
Set up the institutional framework for coordinating the implementation of the NDC							MCVDD
Set up an interministerial task force to coordinate activities (MCVDD, MAEP, MDGL, MIT, MIC, ME, MIC)		100%	0,096			0,096	MCVDD
To support the sectoral ministries involved in preparing the programmes set out in the NDC implementation plan and the applications for project funding under the LDC support mechanisms.		20%	0,08	80%	0,32	0,4	MCVDD
Draw up and implement a programme to strengthen the institutional and regulatory capacities of the Climate Change Management sub-sector;		100%	9	0%	0	9	MCVDD
Promoting scientific, technical and technological research into adapting to and mitigating climate change ;		20%	8	80%	32	40	MCVDD

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
Providing technical assistance and capacity building for financial services: Participation in (i) exchanges of experience in the West African sub-region; (ii) the meeting of the coalition of finance ministers for climate action and (iii) training on environmental tax policy.		100%	0,15	0%%		0,15	MCVDD
Promoting the transfer of technology and know-how on climate change adaptation and mitigation.		0%	0	100%	100	100	MCVDD
Draw up a communication plan to inform all categories of stakeholders about CDN and its benefits for climate action and the environment. development		100%	0,032	0%	0	0,032	MCVDD
Draw up a gender-sensitive sectoral implementation plan for the NDC in the living environment and sustainable development sector (environment, urban planning, housing, forestry)		0%		100%	0,134	0,134	MCVDD

Determine emission factors and other emission parameters specific to Benin in the transport sector		0%		100%	3,500	3,500	MCVDD

Objectives of the proposed measure	Quantified target (2030 horizon)	Unconditional	Cost in (millions US $)	Conditional *	Cost in (millions US$)	Total cost in (millions US$)	Institutions responsible for implementation
Determine emission factors and other emission parameters specific to Benin in the waste sector		0%		100%	0,350	0,350	MCVDD
Carrying out a survey on the penetration rate of improved stoves, gas cooking equipment, refrigerators and air conditioners in households and energy consumption.		100%	0,35	0%	0,000	0,350	ME in collaboration with MCVDD
Carrying out tests to verify the performance of improved stoves distributed by various players in Benin		100%	0,05	0%	0,0	0,050	ME in collaboration with MCVDD
Carrying out a nationwide survey to supplement the information available on the vehicle fleet with data on average annual distances travelled and specific fuel consumption by vehicle category and use		100%	0,10	0%	0,0	0,100	ME in collaboration with MCVDD
		11,6	17,90	88,39	136,30	154,20	
TOTAL		**59,2%**	**5069,03**	**40,8%**	**3487,77**	**8556,81**	

Annex 2: Summary of adaptation measures under Benin's nationally determined contributions

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
Agriculture sector								
1	Projet d'Appui aux Infrastructures dans la Vallée de l'Ouémé (PAIA-VO) (2013-2020). *Pilot phase under implementation (*Government portfolio*)*	To contribute to the population's food security in terms of plant products and to increase Benin's export volume and revenue. Its specific objective is to develop production and marketing infrastructures for low- and medium-grade crops. Ouémé valley to promote growth-generating industries	8	0,002	92	0,02	0,03	MAEP
2	Project for Food Security through Development of Lowlands and Strengthening of Storage Capacity in Benin (PSAAB)	To contribute to food self-sufficiency for the rural poor in Benin, mainly small-scale farmers in the intervention zone	13	2,5	87	16,74	19,24	MAEP
3	Project for Food Security through Agricultural Intensification in Benin (PSAIA)	To improve food self-sufficiency and security for Benin's rural poor, mainly small-scale farmers.	25	1,10	75	3,31	4,41	MAEP
4	Support Project for the Development of Agriculture in the Hills (PADAC)	Strengthen the agricultural capacity of communes and agricultural cooperatives in the Collines department and improve the living conditions of small-scale producers	0	0,00	100	0,52	0,52	MAEP
5	Soil protection and rehabilitation to improve food security project (PROSOL)	Sustainable soil protection and rehabilitation approaches are being implemented on a large scale in Benin.	0	0,00	100	38,63	38,63	MAEP
6	Fonds d'Investissement Agricole (Fi-Agri) Phase 4	Increase and diversify agricultural production by increasing the use of the developed hydro-agricultural potential of the Atacora and Donga departments to contribute to the implementation of the strategic reference frameworks "2017-2021 Strategic Agricultural Sector Development Plan (PSDSA) and National Plan for Agricultural Investment and Food and Nutritional Security (PNIASAN)" in accordance with the 2019 intergovernmental negotiations	0	0,00	100	11,93	11,93	MAEP
7	Green Innovation Centres for the Agri-Food Sector Project (ProCIVA)	Small farm incomes, job creation and food supply in target rural areas are being improved through innovations in the agri-food sector.	0	0,00	100	11,35	11,35	MAEP

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
8	ProSAR	The food situation of people vulnerable to malnutrition, particularly women of childbearing age and young children, has improved	0	0,00	100	10,64	10,64	MAEP
9	ProAgri3 and 4	Sustainable promotion of CVAs in 02 Agricultural Development Centres	0	0,00	100	6,85	6,85	MAEP
10	MARKET GARDENING DEVELOPMENT SUPPORT PROJECT (PADMAR)	Increase the income of market garden farms in the long term, while improving their resilience to climate change.	9	4,45	91	44,97	49,42	MAEP
11	Project to support food crop production and strengthen resilience in the Alibori, Borgou and Collines departments PAPVIRE-ABC	Contribute to improving food and nutritional security and reducing poverty.	29	5,32	71	13,01	18,33	MAEP
12	Agricultural Development and Market Access Support Project (PADAAM)	To sustainably improve food and nutritional security and the incomes of small-scale producers, particularly women and young people.	1	0,52	99	51,31	51,82	MAEP
13	Support project for the development of the sector Cashew nut and agricultural entrepreneurship (PADEFA- ENA)	To help reduce poverty and improve food and nutritional security in Benin.	9	0,39	91	3,90	4,29	MAEP
14	Agricultural Sectors Competitiveness and Export Diversification Support Project (PACOFIDE)	Improving access for producers and SMEs in the agri-food industry to export markets in certain supply chains. and therefore increase the country's exports of high-value agricultural products beneficiary.	10	17,13	80	137,08	171,35	MAEP
15	Rural Irrigated Perimeter Development Project (PDPIM)	To improve food security and reduce rural poverty by developing small-scale irrigation schemes to increase the production and productivity of cereals, vegetables and other food crops.	34	10,20	66	19,80	30,01	MAEP
16	Agricultural Diversification Support Project (PADA-FA)	Restore and improve field productivity and post-harvest value added in targeted value chains (rice, fish, etc.), pineapple and cashew) and promote new areas of intervention such as small-scale livestock farming (poultry, goats and sheep)	10	6,48	90	58,32	64,80	MAEP

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
17	Small Farm Agricultural Productivity Improvement Programme (PAPAPE)	Increase the productivity of rain-fed and irrigated farming systems by, among other things, promoting Integrated Soil Fertility Management (ISFM) on farms	8	0,70	92	8,05	8,75	MAEP
18	Project to support agro-ecological transition in the cotton-growing areas of Benin, phase 2	Sustainable improvement of income of family farms in the cotton-growing areas of Benin.	0	0	100	11,92	11,92	MAEP
19	Support Project for the Development of Protein Sectors (PADEFIP)	To help improve producers' incomes and increase the availability of affordable proteins in rural areas.	0	0	100	6,86	6,86	MAEP
20	Project for the Promotion of Sustainable Aquaculture and Competitiveness of Fisheries Value Chains		3	0,90	97	29,14	30,04	MAEP
21	Agricultural Services Development Project		10	2,01	90	18,13	20,14	MAEP
22	Regional Agricultural Market Integration Project		10	6,20	90	55,78	61,98	MAEP
23	Municipal Development Support Fund (FADeC-Agriculture)		100	3,64	0	0	3,64	MAEP
24	Project to support the sustainable development and integrated management of hydro-agricultural areas (PAVPHA)	Large-scale promotion of high-performance, resilient irrigated agricultural production systems integrated into priority agricultural value chains.	100	10,56	0	0	10,56	MAEP
25	Benin agribusiness development project (PDAB)	The overall objective is to promote job creation through the creation of viable agricultural businesses for young people and women.	100	5,87	0	0	5,87	MAEP
26	Rural Economic Growth Support Project (PACER)	SO1: Strengthen the structure and capacities of agricultural and non-agricultural professional organisations and improve the technical and economic performance of SMEs and agricultural and non-agricultural IGAs; SO2: Facilitate access to finance for SMEs and agricultural or non-agricultural IGAs; SO3: Improve access to infrastructure to support production and marketing.	56	20,63	44	16,21	36,84	MAEP

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
27	Ruminant Herd Sedentarisation Project in Benin (ProSeR)	Contribute to improving livestock production and rational farm management".	14	8,8956	86	54,64	63,54	MAEP
28	Project to support the development of the milk and dairy sectors PRODEFILAV-PEL, a programme to promote meat production and livestock businesses	Contribute to the food and nutritional security of populations and reduce the volume and cost of milk and meat imports.	10	3,51	90	31,57	35,07	MAEP
29	PROVAC	Intensify fish farming production in the target regions through the "farmer-to-farmer" extension approach and improved fish farming techniques.	70	10,74	30	4,60	15,34	MAEP
		Water resources						
30	Integrated Programme for Development and Adaptation to Climate Change in the Niger Basin (PIDACC/BN) - Benin component	To contribute to improving the resilience of the ecosystems of the River Niger and its populations through the sustainable management of natural resources.	8	1,47	92	16,86	18,32	MEM
31	Projet de Développement d'Infrastructures Socio-Economiques et de Sécurité Alimentaire (PDISSA) (Developing 750 ha of irrigated perimeters in the Niger basin) Under development	Contributing to sustained growth in the Niger Basin by combating poverty, strengthening food security and promoting sustainable development	5	0,41	95	7,75	8,16	MEM
32	Development of multifunctional hydraulic infrastructures and sustainable management of water resources (PAG 2017-2021 project)	Promote integrated water resource management at the level of river basins and build multifunctional hydraulic infrastructures	25	8,23	75	24,68	32,91	MEM
33	OMIDELTA Programme - IWRM component	Guarantee a sustainable and equitable supply of drinking water for rural populations in rural localities	10	0,66	90	5,97	6,64	MEM
34	Programme for universal access to drinking water in rural areas, known as the AQUAVI programme	To increase access to water supply services and strengthen service delivery in a number of countries. rural areas	10	21,48	90	193,34	214,82	MEM
35	Master plan for water development and management in Benin: Component 1: Project to build 11 small and medium-sized dams in the Ouémé basin	Initiate a process to gradually mobilise resources in water in the Ouémé basin, with a view to putting them at the service of economic and social development of the country.	20	0,04	80	0,17	0,21	MEM

Forestry	

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
36	PAGEFCOM 2: Projet d'Appui à la Gestion des Forêts Communales, phase 2 (Government portfolio)	Helping to improve food and nutritional security and reduce poverty by developing and rationally managing natural resources.	50	6,27	50	6,27	12,55	MCVDD
37	Integrated border management programme (Government portfolio)	"Strengthen national sovereignty in border areas in order to secure the national territory and create better living conditions for the populations of these areas".	20	2,50	80	9,99	12,48	MCVDD
38	Ecosystem-based Adaptation Project (Project to improve the climate resilience of rural communities in central and northern Benin)	Ensuring communities adapt to agricultural livelihoods	30	2,73	70	6,36	9,09	MCVDD
		Coastline sector						
39	Programme to protect the coastline against coastal erosion (Cotonou-Siafato, Hilacondji-Bouche du roy, Grand-Popo-Ouidah): Project to protect the coastal zone against rising sea levels/erosion coastal	Protecting Benin's coast from the advancing sea	60	232,04	40	154,69	386,73	MCVDD
40	Sustainable cities programme	To achieve sustainability and resilience in Benin's main urban centres by improving the level of infrastructure, facilities and services, and by protecting and enhancing local environments.	70	54,97	30	23,56	78,52	MCVDD
41	Programme for the Adaptation of Cities to Climate Change in Benin (Government portfolio)	To increase the capacity of Beninese cities to adapt to climate change, and to build the capacities of the various municipal and central players in charge of sustainable urban development identified at the level of municipalities and ministries.	50	35,45	50	35,45	70,89	MCVDD
42	Cotonou rainwater sanitation programme (papc)	Reduce people's vulnerability to flooding, promote the construction of socio-economic infrastructure and kick-start Benin's economic and social development.	30	1,29	70	3,02	4,31	MCVDD
		Health sector						
43	Support Programme for Reproductive Health Activities (PAASR)	Improving the quality and accessibility of maternal and child health services	30	12	70	28	40	MS

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
44	National Programme for the Construction, Equipment and Functionality of Health Facilities	Improving infrastructure and equipment in line with environmental and climate change standards; - strengthening the maintenance and upkeep mechanism for the health infrastructures and facilities integrating environmental and climate change dimensions	100	535,5	00	00	535,5	MS
45	National Programme for the Rehabilitation and Construction of Hospitals (PNRCCH)	Helping to improve the quality and accessibility of healthcare and healthcare services	100	39,319	00	00	39,319	MS
		Tourism sector						
46	Making Pendjari/W the benchmark park in West Africa	Enriching and preserving the natural ecosystem by introducing new species: Black Rhinoceros, Derby Eland, etc. - Promoting ecotourism and luxury tourism; - Developing hunting tourism	30	5,11	70	11,93	17,05	MTCA
47	Reinventing the lakeside town of Ganvié	Improving living conditions for the people of Ganvié - Make Ganvié a showcase for lake tourism, an authentic, atypical and original destination	70	2,39	30	1,02	3,41	MTCA
48	Construction of the Museum of the Epic of the Amazons and the Kings of Danhomé and rehabilitation of the surrounding palatial site	To promote popular and family tourism based on the history of the Amazons and the kings of Abomey and the kingdom of Danhomè To present the history of the kingdom of Danhomè in a lively way To inform and educate the public about the different values of the period Motivating and supporting scientific research.	70	2,97	30	1,27	4,24	MTCA
49	Construction of a "Toussaint Louverture" Museum of slavery, resistance and memory in Allada (Project resized)	Build a museum dedicated to the memory of slavery, the origins of slaves and resistance; - Understanding the history of slavery in Benin and the region.	70	0,81	30	0,35	1,15	MTCA
50	Construction of the Vodun/Orisha museum in Porto Novo and renovation of the Adandé and Honmé museums	To offer the world a museum that provides visitors with the intellectual and visual means to better understand Vodun/orisha.	70	1,83	30	0,78	2,61	MTCA

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
51	Development of the "route des couvents vodun/Orisha	Highlighting the cultural heritage associated with the practice of vodun / orisha ; - Suggest ways of interpreting this heritage; - Making this precious heritage accessible to the general public; - Strengthening intercultural dialogue ; - Develop the potential of cultural tourism (generate local, sustainable, quality jobs); Rehabilitating vodun for nationals.	70	0,03	30	0,01	0,04	MTCA
52	Construction of the new palace of the King of Nikki and the Gaani arena	Build a new Baru Tem royal palace in Nikki for the current Emperor and his successors of all dynasties ; - Promoting the cultural values of the Baatonu people - Revealing to the world the originality of the Gaani traditional and cultural festival	70	0,12	30	0,05	0,18	MTCA
53	Identical reconstruction of the historic town of Ouidah, including PCTT	Making Ouidah the flagship memorial tourism destination in Africa; - Boosting Ouidah's tourism potential; - Diversifying tourism products in Ouidah.	70	15,72	30	6,74	22,45	MTCA
54	Construction of a marina near the Door of No Return in Djègbadji-Ouidah	Create a tourist complex and an immersive show trail called "Le Bateau du départ" at Djègbadji; - Creating landscaped areas for meditation.	70	29,84	30	12,79	42,63	MTCA
55	Development of a seaside resort at AVLEKETE	Making the seaside segment a driving force for tourism development; - To provide Beninese and foreign tourists with beaches that are suitable for bathing; - Develop the Avlékété district to develop seaside tourism.	70	0,56	30	0,24	0,80	MTCA
56	Development of tourist sites and their access routes	Diversify tourism products throughout the country; - Increase the capacity of reception infrastructures at eco-tourism sites;	50	29,08	50	29,08	58,15	MTCA

N°	Adaptation measures, implementation status and sources	Objectives	Options and costs					Institutions work
			Unconditional		Conditional		Total cost	
			Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	(millions US$)	
		- build jetties and landing stages to access lagoon sites						
57	Preservation and enhancement of cultural and natural heritage of a cultural nature	Draw up a national list of cultural and natural heritage of a cultural nature; - Restoring and rehabilitating Benin's disappearing cultural heritage; - Promoting the cultural values of our identity (drawing up a directory of living human treasures, passing on their knowledge and know-how to the younger generation, etc.).	100	0,73	0	0,00	0,73	MTCA
Total			31,90	578,47	67,15	1217,66	1796,13	

Annex 3: Summary of mitigation and adaptation measures for planned contributions identified at local authority level

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
1	PARAKOU (attenuation)	Forestry	Implementation of the 2nd communal forest and forage plot	Creating carbon sinks. Strengthen the potential in forage biomass	10	0,002	90	0,02	0,02
2	BANIKOARA (attenuation)	Forestry	Implementation of the 2nd Communal Forest and forage plot	Creating carbon sinks. Enhance forage biomass potential	10	0,01	90	0,09	0, 1
3	PERERE (attenuation)	Forestry	Creation of community forests and training of management committees	Halt deforestation, restore degraded forests and significantly increase afforestation and reforestation at municipal level	10	0,03	90	0,27	0,3
4	Savalou-Bantè-Bassila-Djidja (mitigation)	Forestry	Participatory management plan for 100,000 ha of protected State and local forests	Management and co-management of natural forests in the protected State domain	10	0,018	90	0,162	0,18
5	BANTE (Mitigation)	Agriculture	Restoration of degraded soils in the commune of Bantè	Overall, the aim is to help combat practices that degrade agricultural land	10	0,042	90	0,38	0,42
6	TANGUIETA (Mitigation / adaptation)	Sanitation	Project to strengthen the mechanism for managing and recovering solid household waste in the town of Tanguiéta (PRMGVDSM)	Recovering Solid Household Waste (SHW) to improve living conditions, the environment and human health resilience to climate change	10	0,036	90	0,33	0,36
7	ADJA-OUERE (attenuation)	Agriculture	Development of five hundred (500) hectares of rice-growing lowlands in the commune of Adja-Ouèrè	Improving rice productivity in the commune of Adja-Ouèrè	10	0,018	90	0,16	0,18
8	DANGBO (Mitigation)	Agriculture	Train farmers in soil fertility management methods and promote short-cycle crops	Increase agricultural production yields and reduce the effects of flooding	10	0,063	90	0,56	0,63

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
9	POBE (attenuation)	Agroforestry (oil palm)	Project to create a community dynamic offering greater resilience to the effects of climate change in the Commune of Pobè	Planting 1000 hectares of land with oil palm	10	0,086	90	0,77	0,86
10	HOUEYOGBE (Mitigation)	Agriculture	Restoring soil fertility for agricultural purposes and ensuring food self-sufficiency in the commune of Houéyogbé.	Project to rehabilitate and restore 20 ha of quarry land degraded by gravel mining in the commune of Houblonnage	10	0,007	90	0,06	0,07
11	NATITINGOU (Mitigation)	Sanitation	Healthy and efficient management of urban waste in the town of Natitingou	Helping to clean up the living conditions in the town of : Natitingou	10	0,124	90	1,11	1,24
12	AGBANGNIZOUN (Mitigation)	Energy (solar street lighting and electrification) solar services)	Promoting solar energy for street lighting and communal services in rural areas with the support of the diaspora and partners (PDC project)	Gradual shift towards renewable energies	10	0,005	90	0,05	0,05
13	DASSA-ZOUME (Mitigation)	Energy (energy efficiency)	Promotion of renewable energies and energy-efficient stoves and pressure cookers in the commune of Dassa- Zoumé	Promoting climate change mitigation measures at household level	10	0,025	90	0,22	0,25
14	BANTE (attenuation)	Energy	Electrify the Town Hall offices with solar energy	The aim is to help improve the use of solar energy	10	0,012	90	0,11	0,12
15	DASSA-ZOUME (Mitigation)	Energy	Promoting the partial supply of the buildings of the town hall of Dassa- Zoumé by the solar system	Reducing the Town Hall's electricity bill by using renewable energies	10	0,339	90	3,05	3,39

17	POBE (Mitigation)	Energy	Promote the electrification of the localities of GBANAGO, Onigbolo Village, Otèkotan and Igbo-Ocho by connection to the existing High Voltage (HV) type A network, offering greater resilience to the effects of climate change in the Commune of Pobè.	Extend household access to electric lighting to replace paraffin lighting.	10	0,17	90	1,61	1,78

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
18	ZAKPOTA (Mitigation)	Energy	Electrification of 12 rural localities in the commune of Zakpota by connection to the SBEE network	Extending access to electric lighting to replace paraffin lighting in 12 rural localities	10	0,33	90	2,94	3, 27
19		Energy	*Electrification of 22 villages using solar PV micro power stations*	*Promoting access to clean energy for villages*	10	0,8	90	7,2	8
20	ADJA-OUERE (Mitigation)	Energy (micro power stations)	Installation of mini solar power plants in the villages of Houédamè- Djidagba-Logou-Missèbo-Itchagba- Gbadodo and Itchangni in the commune of Adja-Ouèrè (15 villages)	Providing solar energy to households, administrative and community services	10	0,182	90	1,64	1,82
21	OUAKE Attenuation	Energy	Downstream development of the market garden area of the Komdè dam supplied by a solar pumping system	The general objective is to develop a market garden area downstream of the Komdè dam for sustainable use by market-gardening cooperatives in the villages along the dam (Akoussitè, Wèkètè and Komdè).	10	0,005	90	0,05	0,05
22	PARAKOU (attenuation)	Forestry (reforestation/planting)	Intensive reforestation of forests and roads	Restoring forest cover in the commune of Parakou	10	0,001	90	0,09	0,1
23	MALANVILLE (Mitigation)	Forestry (forest plantations)	Development of 03 public spaces into green areas in the town of Malanville	Enhancing the value of public sites that have been identified with local residents and that make sense to them in their daily lives, and promoting improved local governance for the management of these sites. green spaces in the city's major roundabouts	10	0,011	90	0,1	0,11

24	MALANVILLE (Mitigation)	Forestry	Creation of 05 community forests in the Commune of Malanville	Contributing to the restoration of forest resources by setting up community forests in the commune of Malanville	10	0,007	90	0,06	0,07

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
25	PERERE (attenuation)	Forestry	Creation of community forests and training of sustainable land management committees	Halt deforestation, restore degraded forests and significantly increase afforestation and reforestation at municipal level	10	0,031	90	0,28	0,31
26	AGBANGNIZOUN (attenuation)	Forestry	Reforestation of a 100-hectare estate in the Tanvè district	Build up a forestry resource (heritage) in the commune of Agbangnizoun	10	0,04	90	0,36	0,4
27	BANTE (Mitigation)	Forestry	Improving the management of forest resources in the commune of Bantè	Promoting the management of forest resources	10	0,003	90	0,03	0,03
28	BANTE (attenuation)	Forestry	Reducing population pressure on classified forests	The aim is to help protect the environment	10	0,004	90	0,03	0,04
29	BONOU (attenuation)	Forestry (restoration of riparian areas along the Ouémé river)	Protection and rehabilitation of ecological reserves (biodiversity) along the Ouémé River	The overall aim of the project is to restore the ecosystem and biodiversity of riparian areas along the Ouémé River in the Commune of Bonou.	10	0,104	90	0,93	1,04
30	DANGBO (attenuation)	Forestry (reforestation of the banks of the River Ouémé, public squares and agroforestry)	Develop along the perimeter of the banks of the River Ouémé, along the main roads and public squares	Reforesting different species to make the commune greener and more attractive to tourists	10	0,067	90	0,61	0,67
40	DASSA-ZOUME (attenuation)	Forestry	Reforestation of plantations of fast-growing forest species for wood energy production	Reduce the consequences of climate change linked to the inappropriate cutting down of trees for wood energy production	10	0,02	90	0,17	0,19

41	ADJA-OUERE (Mitigation)	Forestry (plantations of 20 ha of species with	Support for reducing the effects of climate change by planting twenty (20) hectares of seedlings	Improving the greening of the commune of Adja-Ouèrè	10	0,005	90	0,05	0,05

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
		rapid growth)	a fast-growing species in the commune of Adja-Ouèrè						
42	NATITINGOU (Mitigation)	Forestry	Creation of a green belt along the mountainsides of Natitingou Commune	Combating the advanced destruction of plant cover on mountainsides	10	0,062	90	0,56	0,62
43	ALLADA (Mitigation)	Forestry	Reforestation in the commune of Allada (24 ha)	Plant and maintain 143,000 seedlings to plant reforestation areas with fruit species, not forgetting roadsides to combat desertification.	10	0,008	90	0,07	0,08
44	OUAKE (Mitigation)	Forestry	Intensive reforestation of the municipality	Reforest all degraded areas in the commune	10	0,01	90	0,09	0,1
45	TOVIKLIN (Mitigation)	Forestry	Promote the reforestation of 05 hectares of plantations in the commune in 7 schools and 7 CEGs in the seven districts of the TOVIKLIN commune	- Creating wells and water reservoirs - Protecting natural resources. -Strengthening early warning and disaster management systems natural	10	0,004	90	0,04	0,04
				-Strengthening the foundations of agricultural activities					
46	DASSA-ZOUME (attenuation)	Forestry	Improving the management of natural resources to reduce the risks associated with climate change	Managing natural resources as effectively as possible	10	0,01	90	0,09	0,1
47	Ouèssè Tchaourou Savè	Forestry	Creation of a green belt along the Okpara and Ouémé rivers in the communes of Ouèssè, Tchaourou and Savè on 3000 ha (pilot phase 1000 ha)	- Restore degraded forest cover. - Increasing carbon sequestration capacity	10	1,25	90	11,23	12,48
48	POBE (Adaptation)	Agriculture	Project to develop 1,000 hectares for rice production and market garden crops in the commune of Pobè	Develop 1000 ha for the production of rice and market garden produce for the benefit of farmers to strengthen their resilience to climatic hazards	10	0,443	90	3,98	4,43

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
49	BOUKOMBE (Adaptation)	Agriculture	Project to support sustainable agriculture for food and nutritional security by promoting economically viable local sectors.	Improving the economic power of rural populations by building the capacity of producers, processors and relay nurseries in the production of shea, néré, baobab and moringa varieties integrated into agriculture.	10	0,02	90	0,18	0,2
50	GRAND-POPO Adaptation	URBAN PLANNING AND INFRASTRUCTURE CONSTRUCTION	Project to strengthen the municipality's resilience to the effects of climate change	Strengthening regional planning and sustainable environmental management	10	0,005	90	0,05	0,05
51	KANDI (Adaptation)	Agriculture	Project to support the development of market gardening and strengthen the resilience of market gardeners in the Alibori Communes (PADCMCA)	To provide long-term support for improving the performance of the Alibori communes in developing the market gardening sector.	10	2, 9	90	26,1	29
52	KARIMAMA (Adaptation)	Agriculture	Project to support the development of market gardening and strengthen the resilience of market gardeners in the commune of Karimama (PADCMCK)	To provide long-term support for improving the performance of the commune of Karimama in developing the market gardening sector.	10	6,683	90	60,14	66,83
53	KLOUEKANME (Adaptation)	Agriculture	Project to improve the resilience of maize, cowpea, tomato and chilli growing systems in Klouékanmè Commune	Promoting modern production techniques that are resilient to climate change	10	3	90	27	30

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
54	KARIMAMA (Adaptation)	Agriculture	Project to Support the Development of Vegetable Crops and Strengthen the Resilience of Market Garden Farmers in the Commune of Karimama (PADCMCK)	To provide long-term support for improving the performance of the commune of Karimama in developing the market gardening sector.	10	0,007	90	0,07	0,07
55	MALANVILLE (Adaptation)	Agriculture	Construction of three (03) water reservoirs and five (05) fish ponds in the commune of Malanville	Promoting fish farming, animal watering and market gardening and improving the productivity of fish farming systems in the commune of Malanville	10	0,036	90	0,33	0,36
56	MALANVILLE (Adaptation)	Agriculture	Strengthening the coping capacities of flood victims in the commune of Malanville	Ensuring food security for households affected by flooding in the communes of Malanville and Karimama and increasing their ability to adapt to natural disasters. climate change.	10	0,01	90	0,09	0,1
57	KARIMAMA (Adaptation)	Agriculture	Strengthening the coping capacities of flood victims in the commune of Karimama	Ensuring food security for flood victims in the communes of Malanville and Karimama and increasing their ability to adapt to climate change.	10	0,01	90	0,09	0,1
58	AGBANGNIZOUN (Adaptation)	Agriculture	Identify and promote food crops that are resilient to climate change and train farmers in modern cultivation techniques adapted to the effects of climate change. climate change (PDC project)	Reducing the effects of climate change	10	0,006	90	0,05	0,06

N°	Communes	Sector	Mitigation measures or options /adaptation for implementation of the updated CDN at municipal level	Objectives	Options and costs				
					Unconditional		Conditional		Total cost (US$ million)
					Proportion (%)	Cost (millions US$)	Proportion (%)	Cost (millions US$)	
59	SAVE (Adaptation)	Agriculture	Developing and securing agropastoral and fisheries areas	Helping farmers adapt to ccs by curbing soil degradation	10	0,009	90	0,082	0,09
60	OUAKE (Adaptation)	Agriculture	Strengthening the adaptation and resilience capacities of market garden producers to cope with irregular rainfall in the commune	Developing market garden areas in the commune	10	0,038	90	0,34	0,38
61		Agriculture	Adapting agricultural and construction systems to climate change	Adapting agriculture and construction to climate change	10	0,001	90	0,01	0,01
62	OUAKE (Adaptation)	Urban and rural infrastructure development Construction	Project to adapt homes to climate change	Promoting the construction of housing adapted to climate change	10	0,000446	90	0,00399	0,004436
63	OUAKE (Adaptation)	Agriculture	Building the capacity of rice and fish producers to adapt and remain resilient in the face of irregular rainfall	Developing lowlands to help farmers adapt to and remain resilient in the face of irregular rainfall	10	0,008	90	0,07	0,08
64	ZAKPOTA (Adaptation)	Agriculture	Integrated soil fertility management and climate change adaptation techniques project	Improving agricultural production	10	0,022	90	0,2	0,22
65	ADJA-OUERE (Adaptation)	Agriculture	Construction of water reservoirs for rice growers in Houéli gaba, Dagbla and Massè	Improving producers' production capacity	10	0,055	90	0,49	0,55
66	PARAKOU	Sanitation	Creation of a sewage sludge treatment and solid waste management site	Equipping the town of Parakou to manage faecal sludge. Creation of a final landfill for solid waste	10	0,1	90	0,9	1
Total					**10**	**14,39**	**90**	**148,55**	**162,94**

Appendix 4: NDC implementation plan

Activities	2021- 2025					2026- 2030				
	1	2	3	4	5	6	7	8	9	10
Phase 1: Preparatory phase for the implementation of the CDN										
Setting up the institutional framework for implementing the updated NDC (national, sectoral and local coordination units and working teams)										
Organisation of the workshop to launch the implementation of the NDC										
Setting up the Monitoring/Verification/Evaluation system										
Support for the sectoral ministries involved in preparing the programmes set out in the NDC implementation plan and the applications for project funding under the support mechanisms for LDCs.										
Phase 2: Implementation phase										
I / Implementation of the mitigation component										
• **AGRICULTURE SECTOR**										
PROJECTS IN PROGRESS AND PLANNED (**Table 9 of document section A**)										
PROJECTS/PROGRAMMES TO BE DEVELOPED AND IMPLEMENTED (**Table 9 of document section B**)										
Preparatory phase										
Implementation phase										
COMMUNITY-INITIATED PROJECTS (**Table 9 of document section C**)										
Preparatory phase										
Implementation phase										
• **ENERGY SECTOR**										
PROJECTS IN PROGRESS OR PLANNED (Table 10 of document section A)										
PROGRAMME AND PROJECTS TO BE DEVELOPED AND IMPLEMENTED **(Table 10 of document section B)**										
Preparatory phase										
Implementation phase										
COMMUNITY-INITIATED PROJECTS **(Table 10 of document section C)**										
Preparatory phase										
Implementation phase										
• **WASTE SECTOR**										
Ouèssè landfill energy recovery project										
Projects to set up controlled landfill sites in municipalities										
• **LULUCF SECTOR**										
PROJECTS IN PROGRESS OR PLANNED (**Table 11 of document section A**)										
PROGRAMMES AND PROJECTS TO BE DEVELOPED AND IMPLEMENTED (**Table 11 in section B**)										
Preparatory phase										
Implementation phase										

COMMUNITY-INITIATED PROJECTS (**Table 11 of document section C)**										
Preparatory phase										
Implementation phase										
II / Implementation of the adaptation component										
EXISTING SECTORAL PLANS AND PROGRAMMES										
• Strengthening the climate risk forecasting and early warning system for food security in the regions vulnerable agroecological systems										
• Surface water mobilisation for adaptation to climate change (small catchments)										
• Combating climate-sensitive diseases										
• Protecting the coastal zone from sea-level rise/coastal erosion										
• Strengthening local governance for financing adaptation to climate change										
• Building capacity in climate observation										
• Strengthening the resilience of low-lying coastal towns										
• Integrating climate change into sectoral development planning										
• Ensuring the sustainability and resilience of Benin's main urban centres										
• Integrating adaptation to climate change into local strategies for reducing the vulnerability of natural systems and human resources in the Benin section of the Niger basin										
• Mitigation measures in the Agriculture sector with an adaptation co-benefit										
• Energy Sector mitigation measures with an adaptation co-benefit										
• LULUCF mitigation measures with adaptation co-benefits										
• Support for integrating adaptation to climate change into local development plans										
COMMUNITY-INITIATED PROJECTS (**Table 12 of document section C**)										
Preparatory phase										
Implementation phase										
III / Implementation of institutional and regulatory capacity-building initiatives										
Draw up and implement an institutional and regulatory capacity-building programme for the implementation of the NDC										
Draw up and implement a communication plan to inform the various categories of stakeholders about CDN										
Develop and implement a gender mainstreaming strategy										
To promote scientific, technical and technological research into adapting to and mitigating climate change.										
Promoting the transfer of technology and know-how on climate change adaptation and mitigation.										
Organising work to update the CDN										

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