REPUBLIC OF SENEGAL

One People – One Goal – One Faith Faith

2020

SENEGAL'S NATIONALLY DETERMINED CONTRIBUTION

APPROVED DOCUMENT – DECEMBER 2020

Table of Contents

Summary

Senegal's Nationally Determined Contribution (NDC) is part of the forward-looking vision,
"Plan Sénégal Émergent (PSE)", its strategy and development plans as well as sectoral programs for the sustainable management of its natural and environmental resources. The NDC takes up the achievements of the INDC. The CPDN, of Senegal was developed by a team of local consultants under the supervision of the Directorate of Environment and Classified Establishments (DEEC) of the Ministry of Environment and Sustainable Development, in collaboration with the National Committee on Climate Change (COMNACC).

A national workshop held on September 14, 2015, and chaired by the Minister of Environment and Sustainable Development, validated the INDC, with specific commitments to reduce greenhouse gas (GHG) emissions, compared to projected emissions, by 2035. The CPDN was adopted by the Council of Ministers on 16 September 2015.

In 2016, Senegal embarked on the process of updating its INDC to make it an NDC that constitutes the country's commitment under the Paris Agreement. This transition mainly responds to the need to update the data (sectoral, macro-economic, demographic, etc.) used in the development of the INDC, but also to the need to take charge of essential components such as Measurement, Reporting and Verification (MRV), capacity building and technology transfer needs, which are essential for the proper implementation of the NDC as well as the integration of emissions from the oil and gas industry, which is scheduled to start production in 2022.

Also, a rigorous assessment of the environmental situation made it possible to identify:

- Greenhouse gas emission sectors: transport, waste, energy, industry, forestry and agriculture;
- sensitive areas that prioritize activities to adapt to and control the impacts of climate change: coastal erosion, agriculture, fisheries, livestock, health, biodiversity and flooding.

In the two components of this NDC, two objectives are set:

- an unconditional objective, consisting of the implementation of activities with national resources (State, local authorities , private sector, NGOs, etc.), and
- A conditional goal that will be achieved with the support of the international community.

These objectives have been determined and set for each of the sectors and an aggregation of these objectives makes it possible to assess the impact on the country's overall emissions. This translates into a relative reduction in greenhouse gas emissions of 5% and 7% respectively, by 2025 and 2030, compared to the baseline (Business as usual) for the unconditional objective (NDC). This reduction could be increased to 23% and 29% respectively, by 2025 and 2030, compared to the baseline situation, if Senegal benefits from the support of the international community with substantial financing, the facilitation of the transfer of environmentally sound technologies and the strengthening of its institutional and human capacities in the field of climate change (NDC+).

In 2010, global emissions were 16,752 Gg of $C0_2$ equivalent. They will increase steadily, reaching 37,761 Gg in 2030.

Several studies carried out in Senegal provide information on the consequences of climate change. The impacts observed show a downward trend in rainfall, an increase in average temperatures, a rise in sea level, disturbances in the availability of arable land, water and fisheries resources. They reflect the great vulnerability of Senegal's ecosystems, requiring the use of specific mitigation and adaptation actions to future climate prospects, in order to control their potential impacts, particularly in socio-economic terms, on the 60% of the population whose livelihoods depend directly on these resources.

On the projected climate risks, their potential impacts and the vulnerabilities induced, the models generally show a predominance of the risks of droughts, heat waves and an upsurge in extreme wet events. The occurrence of these risks exposes the regions of Senegal differently.

The regions most affected by the increase in the risk of extreme drought are located in the north of Senegal, with the Saint Louis region showing the most intense risk, for an increase in the frequency of droughts of between 20 and 30%.
The frequency of extreme wet events is higher in the low-warming scenario, mainly for areas located in the north and east of Senegal (Matam, Tambacounda, Louga).

The implementation of Senegal's contribution is estimated at a cost of US$13 billion, including:

- US$8.7 billion dedicated to ***mitigation*** , with US$3.4 billion unconditional and US$5.3 billion conditional; and
- US$4.3 billion for ***adaptation***, including US$1.4 billion unconditional and US$2.9 billion conditional.

The unconditional and contingent total amounts to US$4.8 billion and US$8.2 billion, respectively.

It will require significant financial, human and technological resources from Senegal, but also the support of the international community, in order to allow even more significant reductions in GHG emissions and resilience to climate change.

Simulations were used to assess the expected impacts and socio-economic benefits of these measures. Although they intervene directly in the sectors mentioned above, these measures constitute a lever for improving the national economic situation, public health, the management of problems related to urbanization, etc.

Acronyms

AFAT : Agriculture, Forestry and Other Land Use; **BAU** : Business As Usual in English; **BRT** : Bus Rapid Transit;
UNFCCC : United Nations Framework Convention on Climate Change;
CET : Technical Landfill Centre;
CETUD : Executive Council of Urban Transport of Dakar;
CIVD : Integrated Waste Recovery Centre;
CN : National Communications;
COMNACC : National Committee on Climate Change; **CORDEX** : Experimentation of so-called disintegration methods; **NDC** : Nationally Determined Contribution;
INDC : Intended Nationally Determined Contribution;
CRN : Standardized Gathering Center
CRODT : Dakar Thiaroye Oceanographic Research Center;
CSE : Centre de Suivi Écologique;
CSP : Concentrated Solar Power; **DGPRE** : Directorate of Water Resources Management and Planning; **CO2e** : Carbon dioxide equivalent (CO2 equivalent);
SLM : Sustainable Land Management;
GHG : Greenhouse Gases;
Gg: Giga gram;
IPCC : Intergovernmental Panel on Climate Change;
HDI : Human Development Index;
IPCC : Intergovernmental Panel on Climate Change.
MRV: Measuring, Reporting and Verification;
ONAS : National Office of Sanitation of Senegal;
NAP : National Action Plan for Adaptation to Climate Change;
PAP : PI an of priority actions;
PAPIL : Support Programme for Small-scale Local Irrigation; **SIDS** : Small Island Developing States; **PGIES** : Integrated Ecosystem Management Project; **GDP** : Gross Domestic Product;
PIUP : Industrial Processes and Product Use;
LDCs : Least Developed Countries;
NAP : National Plan for Adaptation to Climate Change;
PNGD : National Waste Management Program;
PRACAS : Programme to Accelerate the Pace of Senegalese Agriculture;
PSE : Emerging Senegal Plan;
RCP : Representative Concentration Pathways
RNA : Assisted Natural Regeneration; **SRI** : Intensive Rice Farming System; **CO2** : Carbon Dioxide

CH4 : Methane;
N2O : Nitrous oxide or nitrous oxide;
MW : Megawatt;
MWp : Megawatt-peak.

Introduction

The Emerging Senegal Plan (PSE) is the reference framework for Senegal's economic and social policy by 2035. The PES is focusing on economic growth based mainly on increased activity in the primary and secondary sectors. However, current loss and damage, as well as the projected impacts of climate change on arable land, water and fisheries resources, are likely to jeopardize the success of the PES.

In view of the country's high exposure and vulnerability to climate change and in response to the Paris Agreement, Senegal intends to contribute to the collective effort, through the implementation of mitigation and adaptation measures in priority economic sectors, communities, infrastructure, ecosystems and cities.

The strategy is based on the integration of the climate change dimension into the formulation and programming of development policies, taking into account other priorities such as human and animal health, the fight against poverty and malnutrition, the promotion of renewable energy and energy efficiency and gender mainstreaming.
Regarding the latter, Senegal has embarked on the implementation of a National Strategy for Gender Equity and Equality (SNEEG), based on the promotion of equity and gender equality that challenges all development actors. The Government is committed to integrating gender issues into all public policies.

Senegal's NDC is part of the PSE, echoing its Priority Action Plans.

I. Context

a. Evolution of Emissions

Senegal submitted three communications to the UNFCCC in 1997, 2010 and 2015, with 1994, 2000 and 2005 as reference years, respectively. This shows a net increase in national emissions. The energy and agriculture sectors were the major sources of 40% and 48% of emissions respectively in 2005. The dynamics show an increase in emissions in all sectors between 1994 and 2005, except for the waste sector, which required data refinement in 2005 (Table 2).
Detailed information regarding the 03 submitted papers is summarized in the following table:

Table 1 : Summary of the emissions of the three national communications (Gg CO_{2e})

Inventory year / Sectors	1994 Communication 1	2000 Communication 2	2005 Communication 3
Non-biomass energy	$ 3,788.6	4,663	$ 5,178.93
Agriculture	2,957.6	$ 6,275.89	$ 6,359.84
Rubbish	2,226.2	$ 2,075.64	979,4
Industrial Processes and Use of Products	345,5	301, 51	541
Overall emissions (Excluding removals from forestry)	9317,9	13,298	13,084

Sources: Senegal's national communications to the UNFCCC

NB: The land use, land-use change and forestry sector remains an important carbon sink with increasing net removals (Table 3).

Table 2 : Carbon removals in the forestry and land sector (Gg CO_{2e})

Inventory year Sector	1994 Communication 1	2000 Communication 2	2005 Communication 3
Forestry and land	-5 997	-10 555	-11 434

Senegal has gradually improved the GHG inventory methodology in the forestry sector, with the use of some specific factors, the collection of more accurate data on forest formations and the application of recent IPCC guidelines.

b. Key climate trends and associated risks

Climate trends in Senegal were assessed based on three key parameters, including temperatures, rainfall and sea state. These trends could be modelled using the two scenarios RCP 4.5 and RCP 8.5.
Information on climate scenarios and trends is presented in the following tables:

Table 3: Average change in rainfall and projected temperature by area and by scenario. Rainfall is expressed in mm, while temperature is expressed in degrees Celsius.

	Scenarios	Nord	Sud-Est	Sud-Ouest	Centre-Ouest
Pluie	RCP4.5	-16	-89	-89	-89
	RCP8.5	-8	-61	-61	-61
Température	RCP4.5	+1.18	+1.17	+1.17	+1.17
	RCP8.5	+1.41	+1.37	+1.37	+1.37

Table 4 : Current and Future Trends in Key Climate Parameters

Climatic parameters		Current trends	Future trends
Temperature		• Global increase in minimum temperatures between 1961 and 2010; • The increase ranges from 0.58°C in Dakar to about 1.88°C in Ziguinchor, which recorded a greater increase in the minimum than in Tambacounda (about 1.06°C).	Average increase between +1.17 and 1.41°C by 20351 (Table 3)
Pluviometry		• Decrease in precipitation from 1951 to 2000 at reference stations2. This trend has led to a shift in isohyets from the north to the south of the country. The 500mm isohyet, which was located on the north-Dakar and Linguère axis between 1951 and 1980, is found in the regions of Kaolack and Fatick. Similarly, the 1000 mm isohyet migrated from southern Gambia to the Senegal-Guinea border between 1981 and 2013. • However, there was a trend towards a resumption of rainfall between 2000 and 2010.	• Decrease (negative) towards 2035. The northern area of Senegal will see a decrease of 16 mm on average compared to the reference period (1976-2005). Everywhere else, the decline would be more pronounced and would be on average 89 mm (Table 3).
Sea State	Sea level	• Average sea level rise of 1.4 mm per year has been noted. • Over the past fifty years, an average rate of retreat of the coastline has been observed of between 1 and 1.30 m/year3.	On the entire Senegalese coast and for a sea level rise of 1 m by 2100, predicted that 55 to 86 km2 of beaches would disappear About 6000 km2 of low-lying areas, mainly estuarine areas, would be flooded. **This would be equivalent to a disappearance of all the current mangroves.**
	Temperature Sea surface	Increase in sea surface temperature of approximately 0.04 °C to 0.05 °C per year since the early 1980s.	
	Wind speed	High variability in wind speed over the period 1981-2010. The wind force always remains on a downward slope between 2010 and 2015, with peaks of up to more than 6 m/s.	

1 Data from the National Agency for Civil Aviation and Meteorology (ANACIM)

2 Podor, Dakar, Ziguinchor, Tambacounda

3 Department of the Environment and Classified Establishments, 2005

c. Impacts and vulnerabilities

The assessment of the various impacts and vulnerabilities at the national level shows that all the key sectors of the PES remain directly or indirectly exposed to the impacts of climate change. This vulnerability affects communities, ecosystems, infrastructure and the national economy. On the economic front, a simulation using the T21 model shows that rising temperatures will have a negative impact on GDP growth and lead to a higher level of poverty in Senegal (Figures 1 and 2)[4].

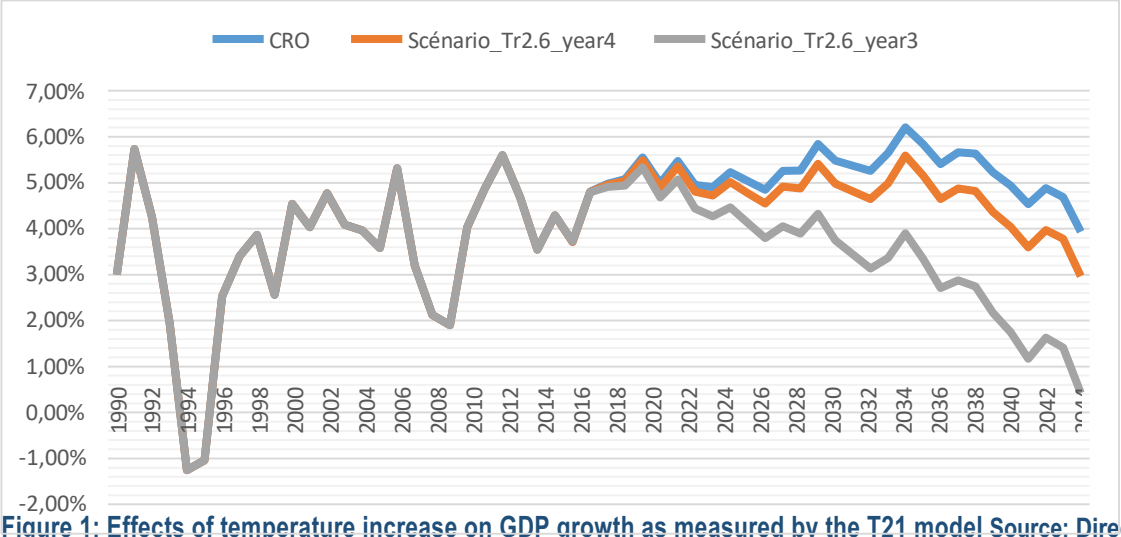


Figure 1: Effects of temperature increase on GDP growth as measured by the T21 model Source: Direction de la Planification (MEFP)

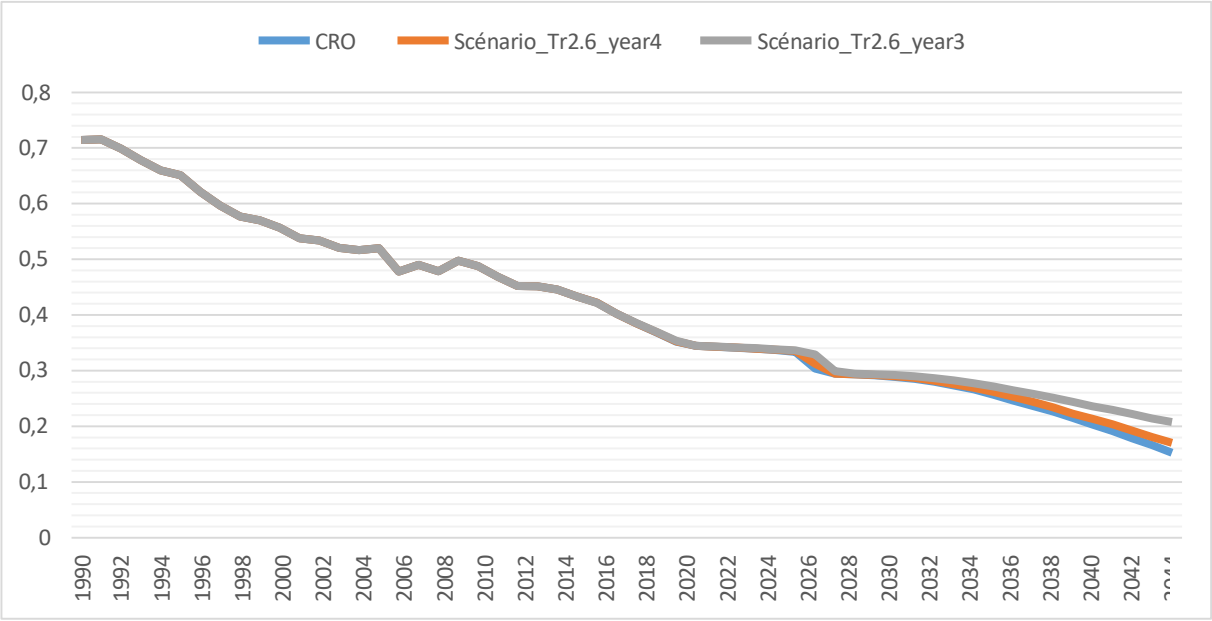


Figure 2: Effects of temperature increase on the fight against poverty Source: Planning Directorate (MEFP)

[4] WB Multisectoral Report, 2017

Maintaining the trends observed in the past, in particular the increase in temperatures and the decrease in rainfall, will have a negative impact on the productive bases of the national economy (biodiversity, agriculture, livestock, water resources, fisheries, coastal zone, etc.) by 2031-2041. Climate change thus appears to be an obstacle to development and the fight against poverty. This represents a major challenge for achieving the objectives of the PES by 2035.

d. Fairness and Ambition

Senegal's NDC reflects a sustained commitment to put the country on a low-carbon development trajectory that ensures the resilience of the economy, communities, infrastructure and cities.
The NDC is equitable in terms of national capacities and the country's climate vulnerability. It is ambitious in that it goes beyond the proposed strategies and programmes granted to LDCs and SIDS in the Paris Agreement.

II. Mitigation Component

The contribution projects a reduction in GHG emissions in 2025 and 2030 in different sectors of the economy relative to projected emissions for the same years, under a reference scenario based on a number of assumptions. It is made up of an unconditional contribution (NDC) and a conditional contribution (NDC+).

The main activities foreseen in the unconditional and conditional contributions cover each of the sectors of the Senegalese economy and their impacts are presented in relation to the GHG emissions of each sector. An aggregation of these emission reductions is also presented to see their evolution in relation to overall emissions. Senegal commits, unconditionally and conditionally, to reduce its GHG emissions, in 2025 and 2030 respectively, compared to projected emissions for the same years, according to a "Business as Usual" scenario in the following sectors:

ENERGY

Table 5: BAU/CDN Energy Emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	19512	23927
CDN	18022	21523
CDN+	12615	14048
% discount CDN	7,6	10
% discount CDN+	35,3	41,2

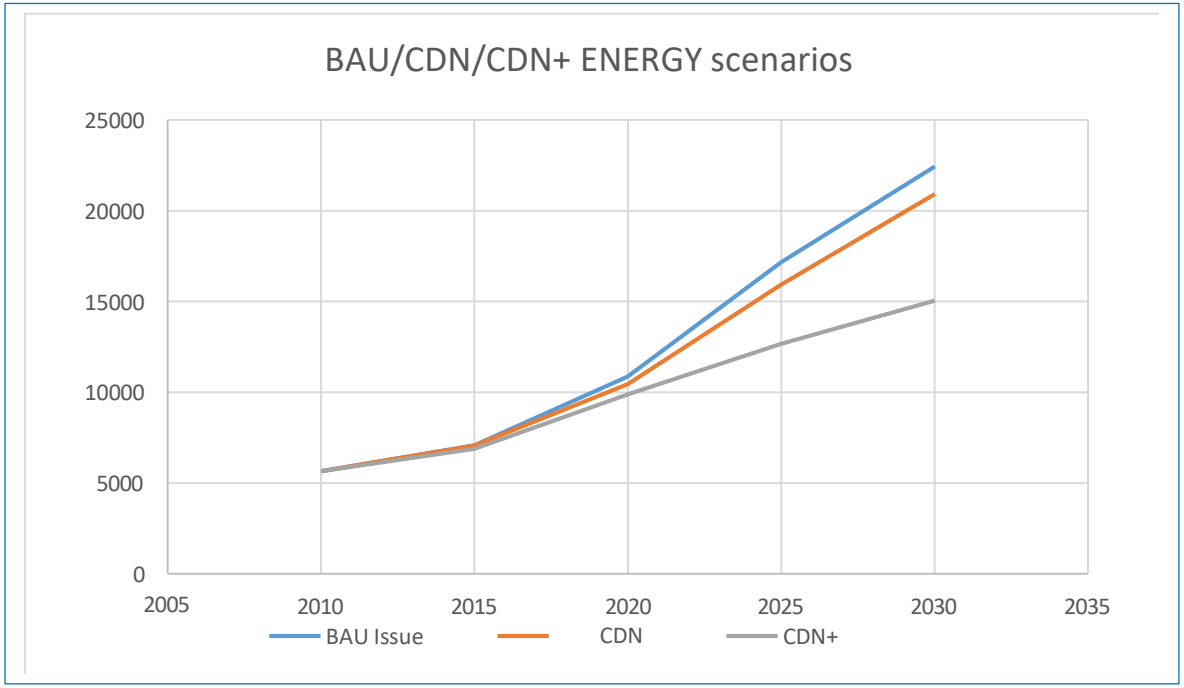


Figure 2 : BAU/CDN/CDN+ Energy scenarios

Emissions from biomass (charcoal and wood production) are accounted for at the level of the forestry sector. Knowledge and control of biomass emission levels will be used to define mitigation actions in the subsector. Details of biomass emissions are shown in the following table:

Table 6: BAU/CDN Biomass Emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	8533	8867
CDN	7702	7621
CDN+	7106	6652
% discount CDN	9,76	16
% discount CDN+	14	24

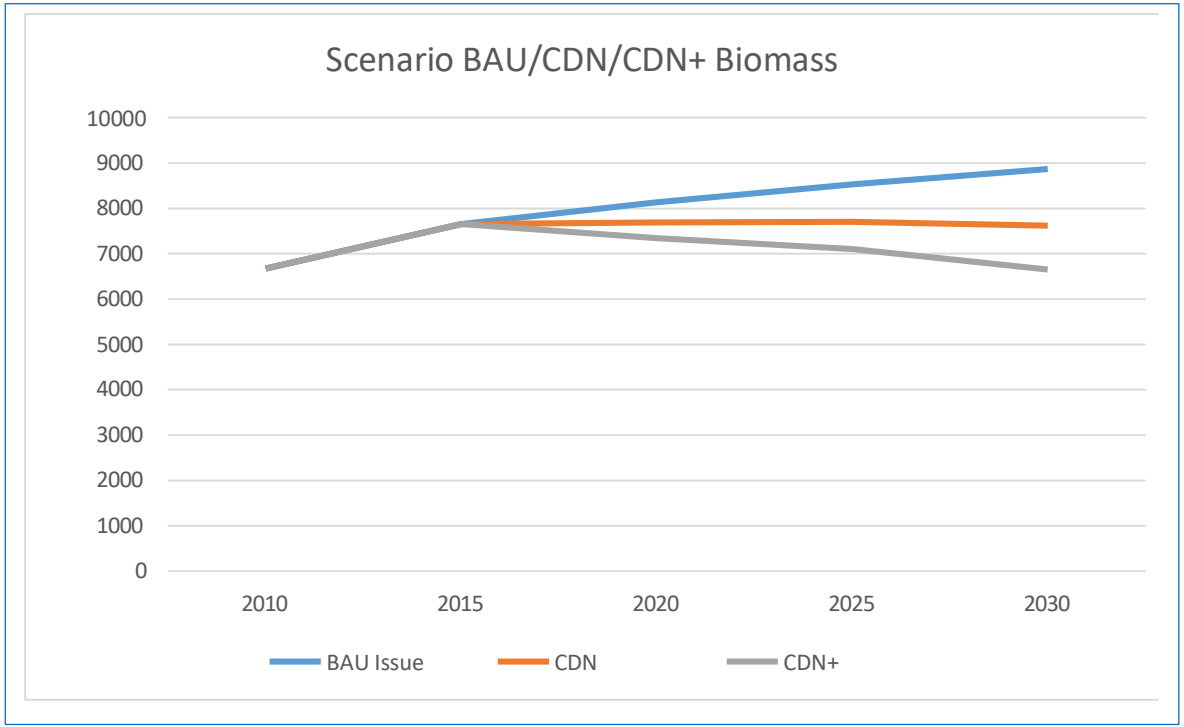


Figure 3 : BAU/CDN/CDN+ Biomass scenarios

AGRICULTURE

Table 7 : BAU/CDN emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	9903	10600
CDN	9732	10350
CDN+	9034	9329
% discount CDN	1,72	2,36
% discount CDN+	8,76	11,98

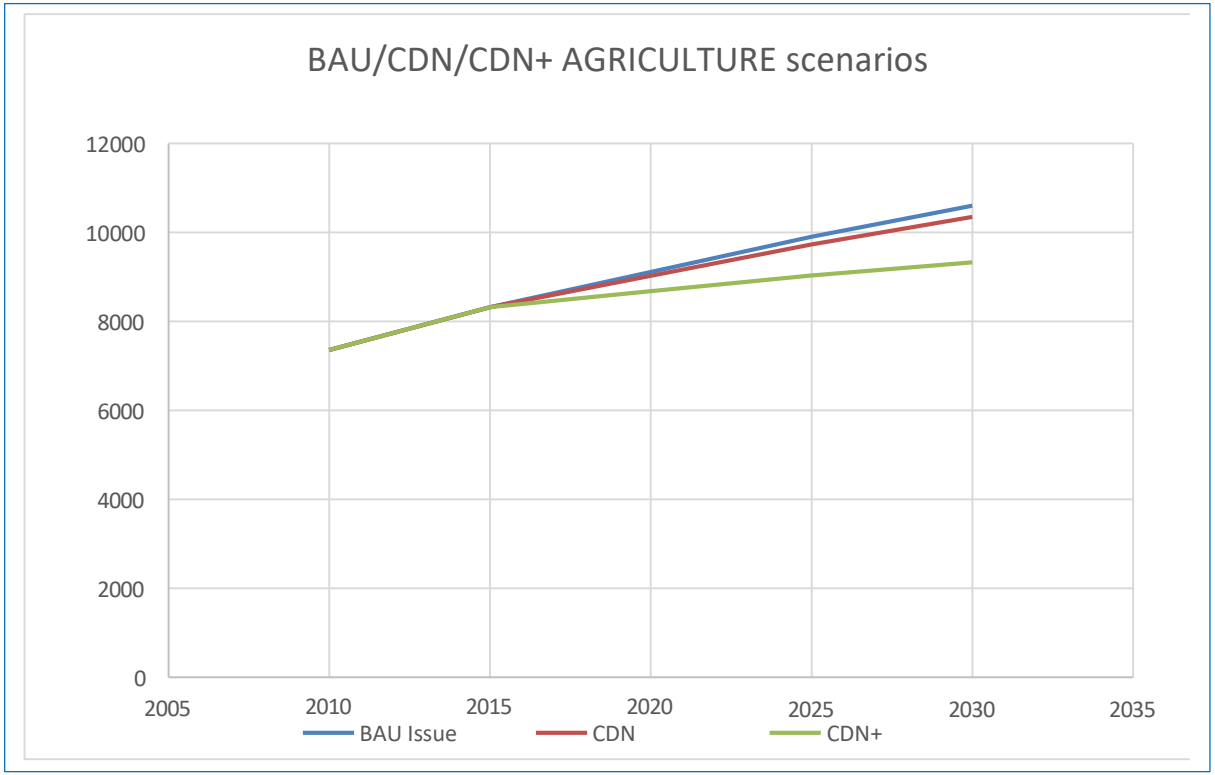
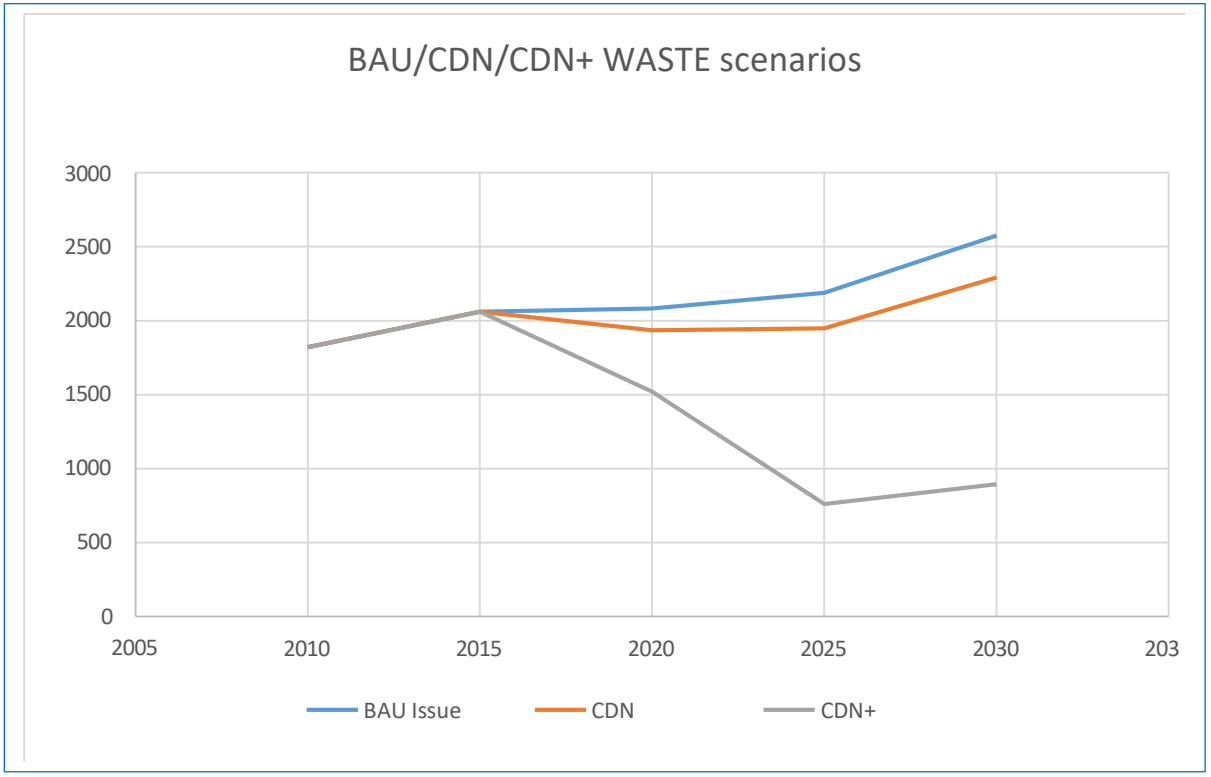


Figure 4 : BAU/CDN/CDN+ Agriculture scenarios

RUBBISH

Table 8 : BAU/CDN WASTE emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	2189	2575
CDN	1948	2292
CDN+	759	893
% discount CDN	10,99	11,00
% discount CDN+	65,28	65,28



INDUSTRIAL PROCESSES AND PRODUCT USES

Table 9 : BAU/CDN Industrial Process Emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	3,953	3,953
CDN	3,953	3,953
CDN+	3,792	3,631
% discount CDN	0,0	0,0
% discount CDN+	4,0	8,1

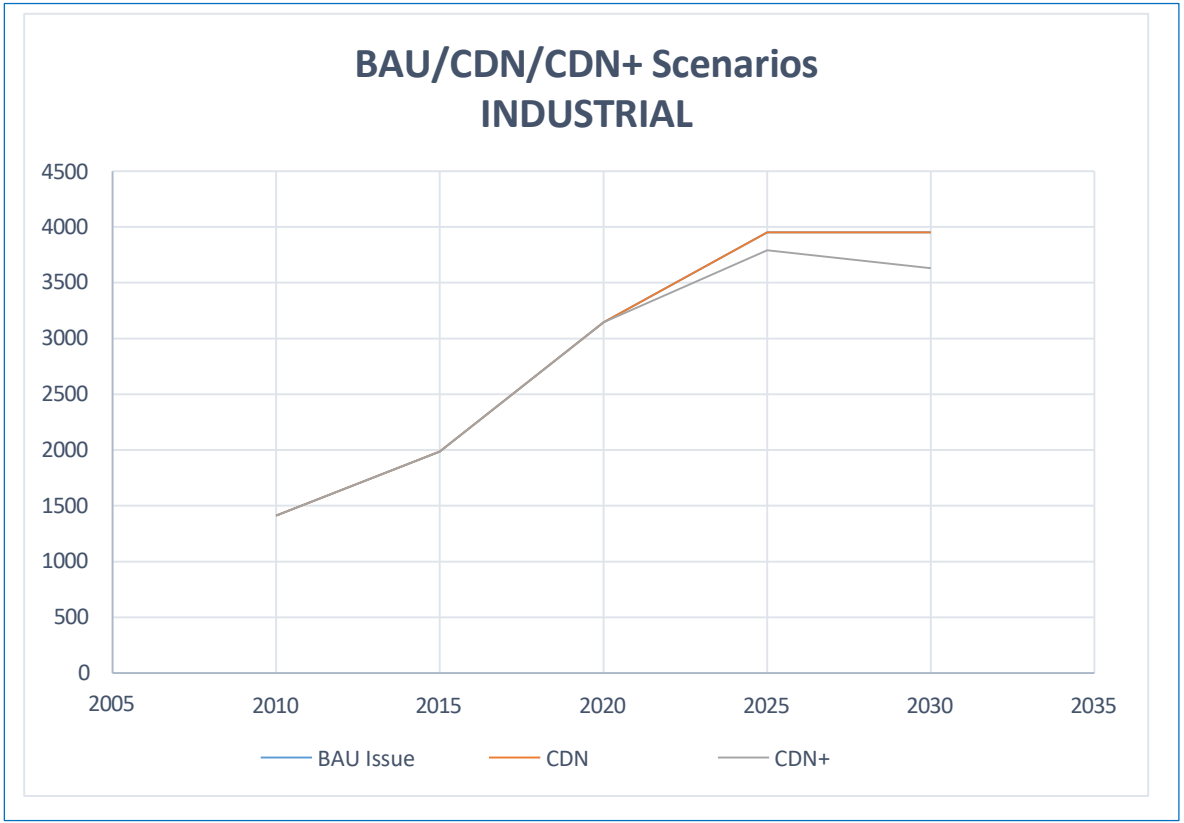


Figure 6 : BAU/CDN/CDN+ PI scenarios

FORESTRY

Table 10 : BAU/NDC removals (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	-11573.11	-11510.66
CDN	-16967.12	-16894.32
CDN+	-29328,21	-29328,21
% CDN Absorptions	-46.608129	-46.77108
% CDN+ absorptions	-153.41684	-154.79173

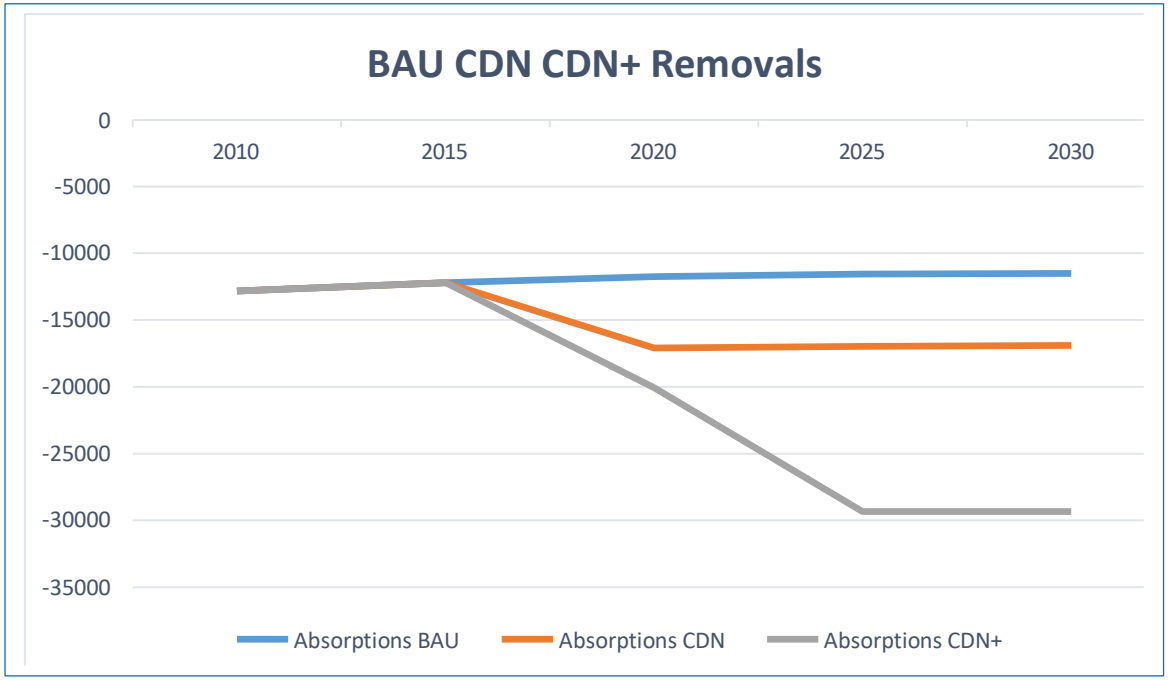


Figure 7 : BAU/CDN/CDN+ Forestry scenarios

Aggregated, these emission reductions will represent 05 and 07%, respectively, in 2025 and 2030 compared to projected emissions, according to a "Business as Usual" scenario, based on domestic and controlled financing.
These reductions will reach 23.7 and 29.5 per cent, respectively, in 2025 and 2030, provided substantial support from the international community.

Table 11 : Overall BAU/CDN/CDN+ emissions (Gg CO_{2e})

Scenarios	2025	2030
CROSSBEAM	32648,6097	37761,1405
CDN	30,987	35 106
CDN+	24883,0564	26611,0057
% discount CDN	5,09	7,03
% discount CDN+	23,78	29,53

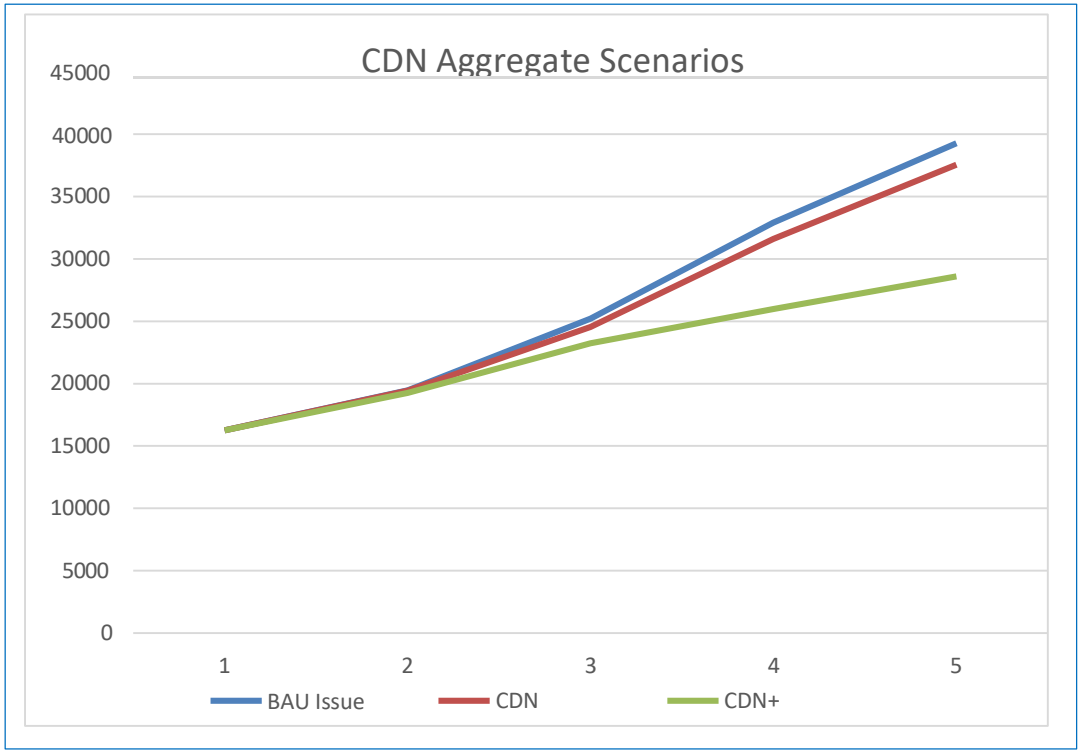


Figure 8 : Global emissions trajectory

The contribution will be implemented mainly by:

- Increasing carbon sequestration, through the implementation of projects related to the agriculture and forestry sectors;
- The energy transition with the integration of renewable energies and the strengthening of energy efficiency in electricity production, in the industrial, transport and residential/tertiary sectors;
- Improving solid and liquid waste management;
- Improvement of industrial processes.

The activities presented in this report are not exhaustive. Nevertheless, they form the basis of contribution in the area of mitigation.

The contribution is defined as the reduction in GHG emissions in 2025 and 2030 compared to the projected emissions in each of the sectors concerned according to a "Business as Usual" scenario.

a. Mitigation targets

Table 12 : Characteristics of the NDC

Lens Type	Deviation from a current practice (BAU) for each of the sectors concerned (Energy, AFOLU, Waste and Industry). Unconditional reduction in emissions compared to a BAU scenario and following the base year. Conditional emission reductions relative to a BAU scenario and following the base year
Base year	2010
Implementation period	2025-2030
Gases covered	CO2, CH_4, N_{2O}
Sectors covered	All sectors (IPCC 2006) - Energy (power generation, household fuels, energy efficiency , transport) - Industrial Processes, - Rubbish - AFOLU (Agriculture, Forestry and Land Use)
Global Warming Potential: CO2:1, CH_4 :21, N2O: 310	
Emission Inventory Methodology: IPCC 2006	
Sectoral objectives	
Energy :	
Unconditional goal	7.6 and 10%,
Conditional Objective	35.4 and 41.2%
Agriculture	
Unconditional goal	1.72 and 2.36%
Conditional Objective	8.76 and 11.98%
Rubbish	
Unconditional goal	10.99 and 11%
Conditional Objective	65.28 and 65.28%
Industrial Processes and Product Use	
Unconditional goal	0%
Conditional Objective	4 and 8.1%
Aggregation of sectoral objectives	
Unconditional goal	5 and 7% reduction in GHG emissions in 2025 and 2030 respectively
Conditional Objective	23.7% and 29.5% reduction in GHG emissions in 2025 and 2030 respectively

The 2010 base year (BAU) GHG emissions are as follows: (see Table 13)

Table 13: Distribution of GHG Emissions in 2010

Sector	Emission level in Gg CO2e	Percentage
Energy	6165	36,8
Agriculture	7354	43,8
Rubbish	1820,8	10,8
Industrial Processes and Product Use	1412	8
Total	16,752	100

NB : Senegal's net emissions in 2010 are estimated at 3,925 Gg CO_{2e}.

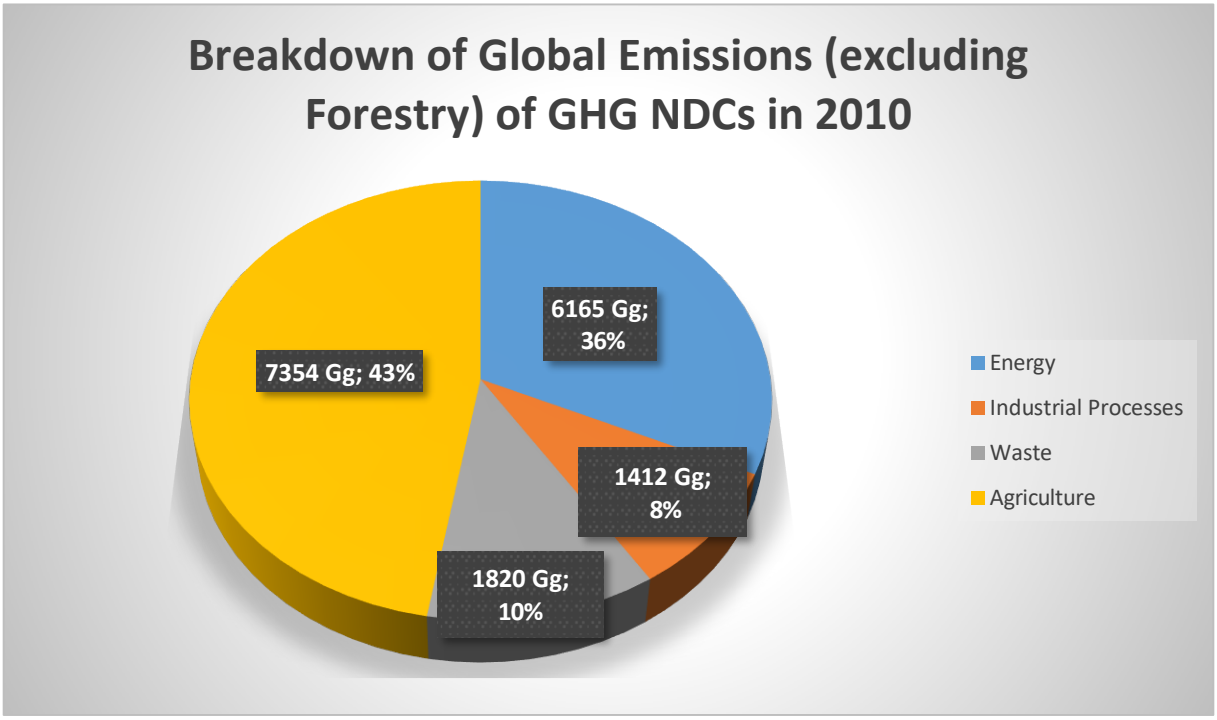


Figure 9 : distribution of GHG emissions in Gg in 2010

The agricultural sector accounted for almost half of Senegal's emissions in 2010. However, projections for 2020-2030 show that the trend will be reversed in favour of the energy sector, due in particular to the increase in energy demand. Detailed information on emissions projections to 2030 is presented in the following table:

Table 14 : Projected emissions by sector to 2030 (Gg CO_{2e})

Year / Sectors	2010	2015	2020	2025	2030
Energy	6165	10,080	13,060	19512	$ 23,927
Agriculture	7354	8323,9	9110,7	9903,4	10600
Rubbish	1820	2061	2081	2189	2575
Industrial Processes and Use of Products	1412	1,986	3,146	3,953	3,953
Total	16752	21,637	25,404	32,648	37,761

Two sectors are the main emitters of GHGs at the national level. The energy sector will grow exponentially. Indeed, it will represent more than 50% of the country's overall emissions in 2022. This situation can be explained by the dynamism of the sector, with the start of oil and gas exploitation from 2022.
Emissions from the agricultural sector will increase gradually and steadily until 2030. Enteric fermentation will remain the major emission category in this sector.

b. Sectoral strategies for the implementation of the NDC

- **Energy sector**

The energy sector is a major support for the development of the economy and the reduction of social and territorial inequalities. The oil bill accounts for nearly 34% of the country's export revenues .
This is how the Emergence Strategy put in place since 2012 reflects Senegal's ambition to guarantee universal access to reliable, sustainable and accessible electricity by 2025. The Emerging Senegal Plan (PSE) reinforces the orientations of the Energy Sector Development Policy Letter of October 2012 concerning electricity, hydrocarbons, access to energy in rural areas, energy efficiency and domestic fuels.

i. Power generation subsector

Sub-sector context	The public electricity production fleet is essentially thermal, i.e. 93% of installed capacity, and the dominant fuel is fuel oil, up to 75%. Access to electricity in rural areas is still limited. A national strategy for the sector has been developed and broken down around the following points: - The development of the offer with new production capacity of up to 1,000 MW; - Universal access to electricity for rural areas by 2025; - Upgrading and developing the transmission and distribution network;
NDC Strategic Actions	- Achievement of a cumulative installed capacity in solar of 235 MW, 150 MW in wind, 314 MW in hydroelectricity in 2030; - Injection of a total capacity of 699 MW in renewable energies in 2030; - Achieved a renewable energy penetration rate of 13.68% in installed capacity, excluding hydroelectricity, in 2019 in the electricity grid; - The installation of 6.18MWp as part of the promotion of solar electrification, at the level of isolated systems outside the Interconnected Grid;
NDC+ Strategic Actions	- Achievement of an additional installed capacity in solar of 100 MW, 100 MW in wind, 50 MW biomass, 50 MW of CSP, by 2030; - Injection of a total additional 300 MW of renewable energy capacity, bringing the total (CDN and CDN+) to 999 MW of renewable energy; - Replacement of fuel oil with natural gas in the dual thermal power plants (oil/gas) and the 320 MW Jindal coal-fired power plant with gas-fired combined-cycle power plants, which will bring the total of 600 MW of installed natural gas between 2025 and 2030; - Achieved 18% by 2022, with a penetration rate of non-hydroelectric renewable energies in the electricity system; - Rural solar electrification in 2025 of: • 2292 localities by mini-grids; • 4356 localities Solar Home System (SHS);

ii. Household Fuels Subsector

Sub-sector context	Domestic fuels (mainly charcoal and fuelwood) accounted for nearly 35% of households' final energy consumption in 2016. Fuelwood and charcoal make up more than 75% of household cooking energy sources. The PSE, through the LPDSE, sets itself the objective of diversifying energy sources, promoting the use of wood substitutes and charcoal.

	Measures for domestic fuels contribute to the preservation of forest resources, with the substitution of fuelwood and charcoal with sustainable sources and efficient cooking equipment.
NDC Strategic Actions	- Broadcast 800,000 Improved Cookstoves (AMs) per year by 2030, up from approximately 350,000 AMs in 2016 - Cumulative construction of 27,000 biodigesters by 2030. - Continuation of butane gas policy and promotion of bio-coal
Strategic actions of the CDN+	- Dissemination of approximately 1,500,000 improved cookstoves per year - Cumulative construction of more than 48,000 biodigesters by 2030 - Promotion of bio-charcoal

iii. Energy efficiency sub-sector

Sub-sector context	The national source of energy savings can be mobilized across all sectors, including the establishment of an operational legislative and regulatory framework, actions for the generalization of efficient lamps (LBC and LED), the standardization and labeling of household and office equipment, and the sustainable management of public lighting. It will also be a question of making the program resulting from the Energy Management Strategy, by 2030.
Strategic actions of the NDC	- Achievement of energy savings of 627.028 GWh (CDN) - Electricity demand decreased by 126.8 MW (CDN)
Strategic actions of the CDN+	- Achievement of energy savings of 3402 GWh (CDN+) - Decrease in electricity demand of 687.9 MW (CDN+), for a total of 814.4 MW corresponding to a 48.9% decrease on the peak expected in 2030.

- Industry Sector

Sector context	The contribution of industry to total GDP in Senegal has fluctuated between 20 and 23% for a decade. The PSE emphasizes industrialization with strategic choices directed towards: - The development of industrial platforms and parks that should allow the upgrading of agricultural value chains and the development of an efficient manufacturing industry; - Better development of mining resources and the exploitation of new deposits of phosphates, zircon, iron and gold.
Actions Strategic from the CDN/CDN+	- Improvement of regulations in the industrial sector (energy supply studies, periodic energy audits, inspections, etc.), - Energy/environmental upgrading of companies, - Waste recovery in agro-industry, - Energy efficiency of cement plants and the substitution of clinker and the use of gas.

- Transportation sector

Sector context	The "transport, post and telecommunications" sub-sector accounted for 22 to 23% of the tertiary sector between 2008 and 2012. The 2014-2023 ten-year strategy of the PES under its Pillar 1 is based on "An efficient transport sector to support the transformation of production and growth" The options proposed under the NDC help to strengthen ambitious actions . They will make it possible to: - A global and sustainable improvement in the conditions of population displacement; - A better contribution of the sub-sector to the growth and productivity of the national economy; - A significant reduction in pollution and its negative impact on economic growth ; - Diversification of modes of transport with the use of rail and maritime transport .
Strategic actions of the NDC/NDC+	- Multiplication of sustainable public transport (Bus Rapid Transit, Regional Express Train) - Promotion of hybrid cars

- Waste sector

Sector context	The waste sector is transversal and in line with the PES. The government has made enormous efforts that have resulted in: (1) the reorganization of the sector, through the development of adequate regulatory texts, (2) the implementation of the National Solid Waste Management Program, (3) the construction of solid and liquid waste management infrastructure, and (4) the adoption of a awareness-raising, training and capacity-building programme.
Strategic actions of the CDN/CDN+	At the level of liquid sanitation - Achievement of an access rate to the sewerage network of 85% by 2030 (i.e. a treatment rate of nearly 70% and a decontamination rate of more than 55%). At the level of solid sanitation - Rehabilitation or closure of departmental and illegal landfills, by 2030; - Construction of standard collection points and integrated waste management centres . - Promulgation of regulations on solid waste management.

- Agriculture sector

Sector context	The second phase of the Programme for the Revival and Acceleration of the Pace of Senegalese Agriculture (PRACAS2 2019-2023), agricultural component of the PSE, has set itself the strategic objective of achieving an annual production of 2,100,000 tonnes of paddy rice, 2,000,000 tonnes of groundnuts, 600,000 tonnes of groundnuts, 600,000 tonnes of groundnuts, etc tons of onions and 200,000 tons of fruit and vegetable exports, by 2023. The

	The implementation of the programme is based on improving land fertility, increasing yields from targeted speculation and water control. The rice area will increase from 677,197 ha in 2019 to 1,001,640 ha in 2023, of which 17.5% is irrigated, 32.5% rainfed and 50% simultaneously irrigated and rainfed is rained. In accordance with the Livestock Development Policy Letter (2017-2021), the State of Senegal also aims to significantly increase productivity and animal production by 2021, through the modernization of livestock practices and support for the meat (cattle and small ruminants), poultry farming (family and industrial) and dairy sectors.
Actions NDC Strategic Strategies	- Put 99,621 ha of agricultural land under Assisted Natural Regeneration (ANR) and 4,500 ha under compost, by 2030 - Providing organic manure and improved compost with biogas production
NDC+ Strategic Actions	- Transition 28,500 ha of irrigated rice to an Intensive Rice Cultivation System (IRS) reducing both the volumes of water used and the quantities of methane emitted. - Increase to 498,105 ha for FMNR and 14,400 ha for compost.

- Forestry sector

Sector context	The Environmental Policy Letter has selected among its specific objectives "To reduce the degradation of the environment and natural resources, to combat the adverse effects of climate change and the loss of biodiversity". One of the programmes focuses on combating deforestation and land degradation in order to: o Ensure land restoration and sustainable management; o Significantly reduce the frequency and magnitude of bushfires; o Reduce the degradation of forest resources.
NDC Strategic Actions	o Annually increase the reforested/restored areas of about 1297 ha of mangroves and 21000 ha of various plantations; o Reduce the area burned due to late fires by 5% and those due to controlled fires by 10% compared to 2015.
NDC+ Strategic Actions	- To protect 500,000 ha of forests, - Reforest and restore 4,000 ha/year of mangroves, - To create 500,000 ha of various plantations - Reduce the area burned by bush fires by around 90% in the fifth year of implementation of the management plans. These efforts will reduce the deforestation rate by 25%, from 40,000 ha/year, in 2010, to 30,000 ha/year, in 2030.

c. Treatment of emission reductions involving carbon market and non-carbon market mechanisms

Market mechanisms are a key tool for the implementation of NDCs. As with the Clean Development Mechanism (CDM) under the Kyoto Protocol, Senegal will continue to carry out mitigation activities under the Paris Agreement's international carbon market mechanisms for the NDC with the collaboration of international partners.

Senegal is committed to rules that ensure environmental integrity, promote sustainable development, and avoid double counting of emission reductions, in line with the rules to be adopted under Article 6 of the Paris Agreement. Senegal also supports a coherent transition of its CDM project portfolio, in the context of the Paris Agreement, taking into account the rules that will be adopted under Article 6.4 of the Paris Agreement.

Senegal's NDC contains a wide range of mitigation activities in the energy, forestry, agriculture, industry and waste sectors. The achievement of conditional targets could be met by market mechanisms. An appropriate emission reduction sharing arrangement between Senegal and partner countries should be considered.

Carbon market projects will have to contribute to the financing of adaptation.

d. Treatment of emissions from ozone-depleting substances (ODS)

Some ozone-depleting substances (ODS) are also GHGs, with more or less significant global warming powers

These substances are regulated by the Vienna Convention, the Montreal Protocol and the Kigali Amendment. At the national level, progress in the implementation of these legal texts has been noted with the establishment of:

- Decree No. 2000.73 of 31 January 2000 on the consumption of O.S.O. (CFC, HCFC);
- an Interministerial Order No. 00526 of 15 January 2014 relating to HCFCs, currently in force;
- an interministerial order to integrate the reduction of HFCs, which have a very high warming potential .

Results have been obtained in the implementation of actions aimed at reducing or even eliminating the consumption of ODS, these include:

- Elimination of CFCs for consumption since 2010;
- The forecast of a 35% reduction in HCFC consumption by 2020 and a total phase-out by 2030;
- The forecast to reduce HFC consumption by 10, 30%, 50% and 80% respectively in 2029, 2035, 2040 and 2045. With the help of the international community, outside the Multilateral Fund of the Montreal Protocol, this programme can be accelerated under the Kigali Amendment.

With this in mind, Senegal expresses its interest in continuing the fight against ODS as well as the implementation of related flagship programmes in connection with existing international initiatives, in the following areas:

- Energy efficiency in industry and large tertiary sectors;

- The introduction of high-performance food refrigeration equipment;

Appropriate regulations will be put in place on the energy standards of household appliances.

The GHG emission reduction impacts expected from the implementation of (1) the Kigali Amendment (HFC substitution) (2) of complementary ODS flagship programmes are presented in the table below:

Table 15 : Avoided HFC Emissions

Periods	2009	2035	2040	2045
Avoided emissions (Gg) with HFC substitution	267	801	1334	2135
Avoided Emissions (Gg) with Implementing implementation of complementary programmes (additional 10% phase-out scenarios)	294	881	1468	2348

III. Adaptation Component

a. Adaptation Objective

The objective of implementing adaptation measures is to increase the resilience of ecosystems and populations to the impacts of climate variability and change.

b. Specific objectives

Based on trends in temperature increase and decrease in rainfall, specific adaptation objectives could be structured around three points:

- Strengthen climate, ocean and coastal observation and data collection networks;
- Strengthen the resilience of ecosystems and production activities;
- Ensuring the health, well-being and protection of populations against risks and disasters related to extreme events and climate change.

c. Key impacts and priority adaptation measures by sector

In view of the potential consequences of climate change at the level of certain PES axes (Agriculture, livestock, fisheries and aquaculture and agri-food (3.1.1); Health and nutrition (3.2.3) and social protection (3.2.4), it appears necessary to strengthen the resilience of the national economy to the consequences of climate variability and change, through current and preventive adaptation measures (**Simulations based on the T21-iSDG-Senegal model**).

Table 16 : Current and Preventive Key Impacts and Priority Adaptation Actions by Sector

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current main priority adaptation measures (2025-2030 for 2°C)**	**Main preventive priority adaptation measures (2040-2050 for 4°C)**
Agriculture	• Increased evapotranspiration • Disruption of the varietal map • Disruption of the crop calendar • Resurgence of weeds and insect pests • Reduced soil fertility • Reduction of agricultural land (2,500,000 ha of degraded arable land in 2014) • Decline in agricultural production	• Disruption of the varietal map • Disruption of eating habits • 30% drop in cereal production expected by 2025 • Increase of potential evapotranspiration of around 5% in West Africa • 8% drop in millet yields in 2050	• Early warning system • Sustainable Land Management (defence and restoration of degraded land; restoration of soil organic fertility ; agroforestry, etc.) • Salvage of salty land • Use of suitable varieties (short cycle and temperature) • Promotion of integrated agriculture-livestock-agroforestry production systems • Strengthening resilience through the diversification of production systems (improved food and nutrition security , etc.) • Water management (Promotion of local irrigation, development of retention basins for supplementary irrigation) • Promotion and Use of Climate Information and Services • Climate-related risk and disaster management • Agricultural Insurance • Post-harvest strategies and management (storage, drying, etc.) • Agricultural Production Planning • Processing and valorization of agricultural products	• Early warning system • Strengthening research on adapted varieties (short cycle and temperature) • Building resilience through diversification of production systems (integrated system promotion) • Institutionalizing the use of climate information and services • Climate-related risk and disaster management • Promotion of agricultural insurance • Post-harvest strategies and management (storage, drying, etc.) • Specialization of agro-ecological zones according to climate projections • Artificial rainfall • Agricultural production planning; • Processing and valorization of agricultural products

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current main priority adaptation measures (2025-2030 for 2°C)**	**Main preventive priority adaptation measures (2040-2050 for 4°C)**
Breeding	• Reduced productivity and forage quality • Scarcity of water and fodder resources • Increased competition for access to water resources • Decline in livestock productivity • Resurgence of animal diseases	• Inflation in the prices of livestock products which could strongly affect the incomes of livestock farmers • Changes in the severity and spread of animal diseases • Decline in the quality of animal production (meat, milk, etc.).	• Early warning system • Semi-stalling • Sustainable management and conservation of pastoral resources (transhumance corridors, integration of fodder crops, cross-border management); • Promotion of a sustainable system for the collection and conservation of fodder • Strengthening the production, dissemination and use of climate information • Promotion of livestock insurance • Improved animal health and productivity • Development and strengthening of pastoral units (to be specified) • Genetic improvement of species	• Semi-stall early warning system • Sustainable management of pastoral resources (transhumance corridors, integration of fodder crops, cross-border management) • Strengthening the production, dissemination and use of climate information • Promotion of livestock insurance • Improved animal health and productivity • Development and strengthening of pastoral units • Genetic improvement of species

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Fishing	• Scarcity and or migration of fish stocks • Massive loss of jobs • Increase in accidents at sea and destruction of fishing-related equipment and infrastructure • Senegal's trade balance deficit • Impoverishment so me fishing communities • Increase in illegal emigration	• Collapse of fisheries (e.g. sardinella, sole, molluscs, etc.) • Increase in conflicts between small-scale fishermen on the one hand and between small-scale and industrial fishermen on the other • Widening of Senegal's trade deficit •	• Sustainable management of fisheries resources and restoration of marine habitats ; • Improving the management effectiveness and extension of marine protected areas and marine parks (10 MPAs by 2025) • Promotion of sustainable aquaculture development; • Improved safety of fishing communities and fisheries-related infrastructure • Mangrove restoration and sustainable management	• Sustainable management of fisheries resources and restoration of marine habitats • Improving the effectiveness of management and expanding marine protected areas and marine parks (15 MPAs) • Promoting the development of sustainable aquaculture • Improved safety of fishing communities and fisheries-related infrastructure • Improved research on mangrove development dynamics and associated ecosystem services • Mangrove restoration and sustainable management

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Coastal zone	• Widespread retreat of the coastline (1.25 to 1.30 m/year)[5] • Loss of sandy beaches with immediate negative effect on beach tourism • Displacement of coastal communities • Reduction in the size of islands (risk of extinction of islands) • Destruction of coastal infrastructure • Salinization of groundwater and agricultural land	• Increasing sea level rise • Risk of submersion of low-lying coastal areas • Increased vulnerability of small islands6 and low-lying coastal areas to coastal erosion and sea-level rise • Increase in displaced coastal communities • Increased salinization of groundwater and agricultural land	• Integrated management of coastal zones (implementation of a coastal monitoring system, identification of forcing factors and physical processes that govern the functioning and dynamics of the coast, updating of the legal and institutional framework of the coast, morphodynamic modelling of the coastal zone, identification of the main coastal risks and areas at risk, coastal occupation planning , etc.) • Protection and management of risk areas and restoration of degraded coastal ecosystems • Identification of adaptation issues • Regulation of coastal occupation	• Knowledge of the wave climate and their modelling • Identification of areas at risk in the event of sea level rise • Analysis of coastal risks, vulnerability of infrastructure and populations • Regulation of coastal occupation

[5] IUCN, 2004

[6] Sr15_spm_final (IPCC, 2018)

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Water Resources	• Variation in cumulative rainfall since the 70s • Shift of isohyets from north to south • Sudden drop in the average annual flows of the major rivers (nearly 60% for the Senegal River7) • Drying up in places of some rivers (Casamance, Sine Saloum) as well as some continental rivers, temporal ponds and other floodplains • General drop in the water table	• Rainfall of the order of 5 to 20% decrease in West Africa as a whole • Threats to freshwater demand • Increase in the maximum duration of pockets of drought by up to 25% in the Sahelian zone • Increase in the intensity and frequency of droughts8 • Increased risk of drought and water stress • Sharp increase in flow coefficients • Decline in aquifer recharge	• Integrated water resources management (Resource management: knowledge of availability, flows, quality, demand, uses) • Construction of retention basins • Seawater desalination • Water transfer • Multiplication of boreholes	• Integrated water resources management (Resource management : knowledge of availability, flows, quality, demand, uses) • Construction of retention • Seawater desalination • Water transfer • Multiplication of boreholes

[7] IUCN, 2004
(IPCC, 201
8)
r15_spm_final (IPCC, 2018)

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Biodiversity	• Ecosystem fragmentation and habitat loss • Decline in forest areas of certain species • Declining productivity of ecosystem services • Regression of the natural vegetation of the Niayes ecosystem of around 57% between 1972 and 2012 • Decline in forest area galleries of around 22% in Casamance and 50% in eastern Senegal between 1972 and 1972 2012	• Loss of selected ecosystems and associated ecosystem services[9] • Loss and/or risk of extinction of certain species • Risk of increased bushfires • Declining productivity of ecosystem services • Development of invasive species	• Strengthening the knowledge base on biodiversity in relation to the impacts of climate change • Strengthening ecosystem resilience	• Strengthening the knowledge base on biodiversity in relation to the impacts of climate change • Strengthening ecosystem resilience

[9] Sr15_spm_final (IPCC, 2018)

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Health	• Changes in the geographic distribution and incidence of vector-borne diseases; • Increase in airborne diseases, including acute respiratory infections (ARI); • Exacerbation of concentrations of allergenic substances; • Increase in water-related diseases; • Appearance of larval sites that are vectors of serious diseases	• Changes in the geographic distribution and incidence of vector-borne diseases • Increase in airborne diseases, including acute respiratory infections (ARI) • Increase in water-related diseases	• Strengthening integrated epidemiological surveillance; • Prevention and control of climate-sensitive diseases in climate-prone areas • Strengthening vector control	• Strengthening integrated epidemiological surveillance; • Prevention and control of climate-sensitive diseases in climate-prone areas • Strengthening vector control

SECTOR	IMPACTS AND VULNERABILITY BY SECTOR		PRIORITY ADAPTATION MEASURES	
	Current impacts - 2°C scenario	**Future impacts - 4°C scenario**	**Current impacts - 2°C scenario**	**Future impacts - 4°C scenario**
Flood Risk and Disaster Management	• Loss of life, • Destruction of infrastructure (roads, bridges, homes); • Economic slowdown • Appearance of waterborne diseases	• Increase in the frequency and intensity of intense rainfall in several regions10 including those between the tropics	• Implementation of the National Spatial Planning Plan and Master Plans • Urban restructuring and relocation of priority areas • Strengthening sanitation infrastructure and stormwater drainage systems in cities	• Implementation of the National Spatial Planning Plan and Master Plans • Urban restructuring and relocation of priority areas • Strengthening sanitation infrastructure and stormwater drainage systems in cities

10 Sr15_spm_final (IPCC, 2018)

d. Adaptation Implementation Mechanism

The dynamic nature of vulnerability, often influenced by several factors (environmental, socio-economic, political and institutional), makes any action to adapt to climate change complex. The following points are major issues that Senegal will have to master:

- **Adaptation planning at the national level** : adaptation initiatives undertaken and implemented at the national level usually provide responses to emergency situations. The National Adaptation Plan (NAP) currently being developed will make it possible to integrate a short-, medium- and long-term planning approach into Senegal's future initiatives;
- **Good control of the regulatory framework and the means of implementing commitments** : the proper implementation of commitments will require the strengthening of technical means (regular system of quantitative and qualitative data collection), technological (appropriate equipment) and human resources (strengthening knowledge and updating of curricula). It will also be necessary to ensure the implementation of simplified legislative procedures and sectoral codes (Fisheries Code, Environmental Code , Forestry Code, etc.) that take into account climate dynamics;
- **The implementation of a multisectoral approach**: climate change has a transversal impact on key sectors of the national economy. Effective resilience to this issue requires the adoption of a multisectoral and intersectoral approach to strengthen consultation between actors and facilitate the establishment of a harmonized framework for future interventions;
- **The development of an effective communication strategy** : it is essential that political actors are aware of the effects of climate change, in the same way as the communities impacted. The adoption of a communication strategy oriented towards "citizen" and "decision-maker" then becomes a necessity, in order to better involve all stakeholders in the process initiated by Senegal;
- **Assessing the cost of adaptation** : Climate change is an ongoing process. In addition to defining how adaptation will be carried out, it is essential to know how much we can adapt to an ever-changing climate. This assessment is often lacking due to the lack of data and modelling to properly identify the economic desirability of the proposed adaptation measures.

IV. NDC Monitoring, Reporting and Verification System

Under the supervision of the Department of Environment and Classified Establishments of the Ministry of Environment and Sustainable Development and with the support of COMNACC, the monitoring and evaluation of the NDC will be carried out by the sectoral technical services.
This will involve, among other things, monitoring the implementation of the activities foreseen in this contribution as well as the various indicators of the NDC.
A capacity building plan for the sectors concerned by the MRV will be established in the NDC implementation strategy with the corresponding costs.

V. Financial implementation of the NDC

The assessment of the funding needs for climate change mitigation and adaptation actions under this NDC is based on the lists of identified programmes and projects (see Annexes 1 and 2). It should be noted that the implementation of the NDC is accompanied by the development of an operational strategy for the implementation and financing of the NDC.

This strategy will make it possible to establish the appropriate technical, social and financial modalities conducive to the completion of the NDC within the planned deadlines.

1. Attenuation

The financing needs for GHG Mitigation amount to approximately US$8.7 billion, of which US$3.4 billion is unconditional and US$5.3 billion is conditional. (See table for more details)

Table 17 : NDC Financing Needs by Sector in US Dollars

Sectors	Unconditional costs	Contingent Costs	Total
Power generation	729 472 000	1928 640 000	2 658 112 000
Domestic fuels	114 144 000	209 920 000	324 064 000
Energy Efficiency	19 090 000	619 258 000	638 348 00
Industry	42 400 866	488 414 222	530 815 088
Transport	1 582 000 000	13 120 000	1 595 120 000
Rubbish	648 883 026	1 185 800 000	1 834 683 026
Agriculture	255 910 688	470 802 202	726 712 890
Forestry	4 681 100	450 117 000	454 798 100
Total	3 396 581 680	5 366 151 424	8 762 733 104

2. Adaptation

Senegal's financing needs for Climate Change Adaptation over the period amount to approximately US$4.3 billion, of which US$1.4 billion is unconditional and US$2.9 billion is conditional (Table 4).

Table 18: Funding Needs for Adaptation to Change

FINANCING REQUIREMENTS (US$)			
Sectors	**Unconditional (1)**	**Conditional (2)**	**Total (1+2)**
Agriculture	169 366 600	513 581 286	682 947 886
Breeding	150 721 824	251 305 352	402 027 176
Fishing	39 800 000	238 200 000	278 000 000
Water Resources	317 043 200	537 735 200	854 778 400[11]
Coastal areas	158 951 052	504 618 800	663 569 800
Biodiversity	15 490 000	202 540 000	217 490 000
Health	325 653 347	175 351 803	501 005 200
Flooding	213 086 800	504 618 800	717 705 600[12]
Total	1 387 112 823	2 927 951 241	4 315 064 064

Ultimately, the financial requirements of the NDC amount to US$13 billion, broken down as follows:

- **Unconditional: $4.8 billion**
- **Conditional: US$8.2 billion.**

Note : This estimate does not cover capacity-building aspects. These are estimated at 100 million US dollars during the period 2020-2030.

This capacity building needs assessment will be detailed with the NDC implementation strategy.

[11] This amount does not include costs related to capacity building, MRV and strategic analysis, estimated at CFAF 208,000,000

[12] The cost of adaptation needs for the flood sector was calculated using $1 = 600 FCFA

VI. Macroeconomic impact

a. Articulation between the NDC and the Priority Action Plan (PAP) of PES 2

In the context of the integration of Climate Change into public development policies, a simulation of the level of consideration of NDC options at the level of PAP-PES 2 was proposed. The simulation compares the cost of the unconditional NDC actions under its adaptation/mitigation components and the cost of the low-carbon and climate-resilient projects and programmes of the PES2 PAP. The analysis concluded that :

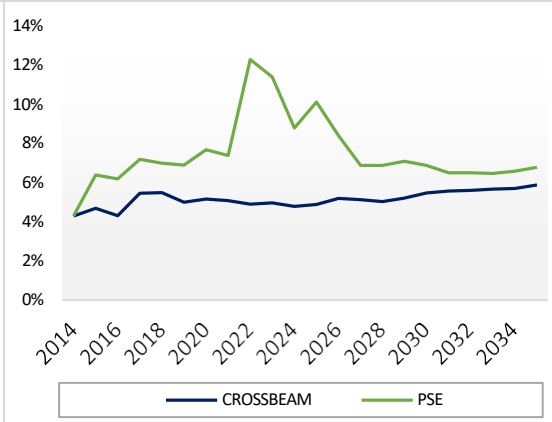
- The implementation of the "climate" projects of the PES 2 will allow Senegal to meet the commitments contained in the unconditional NDC. As proof, the overall cost of the PAP-PSE2 climate projects is estimated at 3162 billion CFA francs, while that of the unconditional NDC is 2734 billion CFA francs;
- This simulation on the consideration of climate in PES2 shows significant progress in the process of greening our public policies. It is important to continue this dynamic noted in certain sectors (energy, flooding, industry, etc.) and to improve the consideration of others (coastal erosion , livestock, health, etc.) in the PES2.

b. Socio-economic impact of planned measures

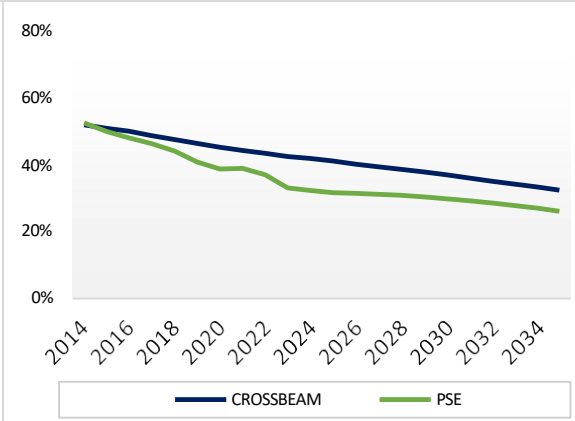
The impact analysis of the planned options is done using the T21-iSDG-Senegal model, which is an integrated medium- and long-term planning tool. Through its systemic approach, it integrates multiple economic, social and environmental variables into a single, coherent framework. A major strength of the T21-iSDG-Senegal is that the tool replicates the complex web of causal interdependencies and the many important feedback loops that are the engine of growth and development. To do this, two scenarios are envisaged: the baseline scenario (BAU) and the PES scenario, which fully integrates the options provided for in the NDC (see part 4).

The implementation of the adaptation and mitigation measures planned by Senegal under the PES, in its phase 2, is expected to generate significant socio-economic benefits in several sectors. At the macroeconomic level, these investments are expected to boost economic growth, create jobs and reduce poverty. In terms of production, simulations indicate an average annual growth rate of gross domestic product (GDP) of 9.1% over the second phase of the PES (2019-2023) and 7.9% by 2035. This increase in wealth is also accompanied by an improvement in the standard of living of the Senegalese. In line with the options in the ESP, the incidence of poverty is projected to decline by 9.4 percentage points compared to the baseline scenario in 2023 and 6.3 percentage points in 2035.

GDP growth rate



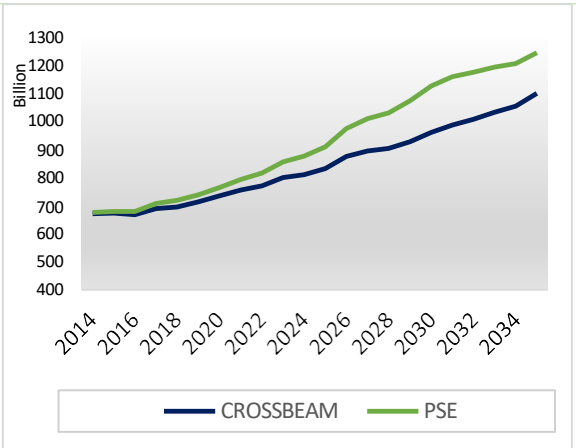
Proportion of the population living below the poverty line



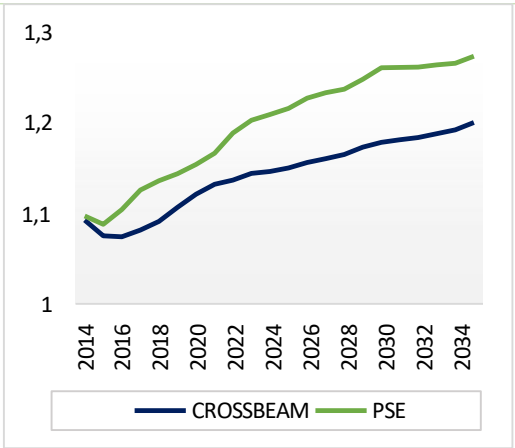
Source: Simulations from the T21-iSDG-Senegal model

In the agriculture and land management sector, the planned investments are expected to improve the level of soil yields and increase production. Thus, agricultural production is expected to grow at an average rate of 3.3% over the period 2019-2035. This performance would promote the availability of power and contribute to a improved food and nutrition security. Thus, the nutrition quality index is expected to increase by 27.5% relative to the baseline scenario, in 2035.

Agricultural production in



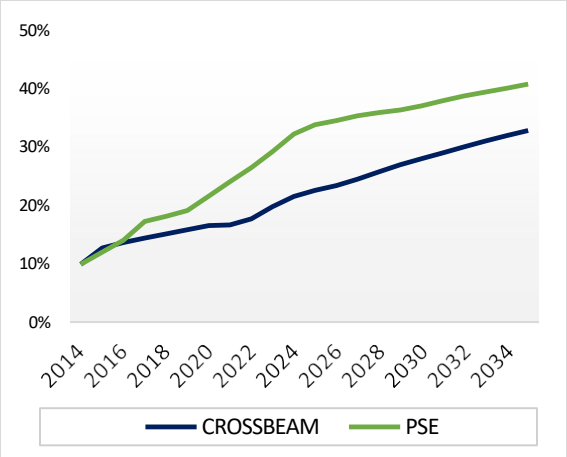
Quality of nutrition



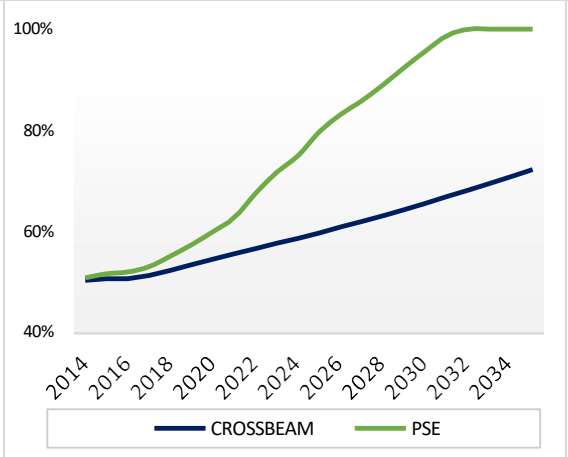
Source: Simulations from the T21-iSDG-Senegal model

In the energy and waste management sector, the options in the NDC are expected to reduce CO2 emissions through the promotion of renewable energy in the energy mix as well as urban waste collection and treatment. The share of clean energy is expected to reach 40.7% of global electricity production in 2035, in the PES scenario, compared to 32.8% in the status quo. These measures will expand access to energy for the population and improve household well-being. In addition, a significant contribution to the country's energy independence is expected. In addition, the use of modern forms of energy in homes and the sustainable management of urban waste will make it possible to limit air pollution and consequently reduce the adverse effects on the health of the population.

Share of renewable energies in the mix



Municipal waste collected and treated (in %)



Source: Simulations from the T21-iSDG-Senegal model

For adaptation-related sectors, the expected impacts are as follows:

Soils and Agriculture

- Reduction of the incidence of poverty;
- Contribution to better food and nutrition security;
- Building resilience;
- Job creation;
- In 2035, average agricultural yields will increase to 3.2 tonnes for the BAU trend scenario vs. 4.2 tonnes for the proactive soil policy scenario.

Fishing :

- Creation of an added value of US$9,200 million in the sector by 2035;
- Better economic and social contribution of the sector, through sustainable fisheries management (crisis and climate control).

Coastal areas:

- Reduction of socio-economic risks negatively impacting the economic performance of the tourism sector in the most degraded areas;
- Combating the decline in fishing yields and direct costs on coastal infrastructure. Water resources:
- Limitation of the rural exodus and its harmful effects;
- Obtaining "productive water" that generates added value in agricultural regions thanks to the works put in place;
- Creation of job opportunities in the areas concerned by the work works;
- Recharge of groundwater;
- Contribution to the fight against salinization problems;
- Participation in flood control;
- US$9.08 million in benefits from adapting to the risk of marine submersion in St. Louis;
- Reduction in the net present cost (CAN) related to coastal erosion, estimated by the World Bank at US$688 million .

Health

- Reduction of the costs of deteriorating the health status of populations, estimated at US$2,400 million , by 2035.

Flood

- The expected socio-economic benefits of flood prevention correspond to the losses and damage avoided;
- Reduction of the risk related to the proliferation of waterborne diseases (diarrhoea, dysentery), malaria and skin diseases;
- Reduction of the risk of school dropout due to the occupation of schools by the victims or the impossibility of reaching classrooms during the rainy season

Conclusion

Senegal's contribution reflects the government's strong commitment to mitigating GHG emissions in all sectors of the economy. These reductions are greater in the energy and agriculture sectors , which today contribute the most to national CO2 emissions.

It also sets out several specific adaptation measures, taking into account the impact of climate change on key areas of the Senegalese economy. This unprecedented effort is a condition for the success of the Emerging Senegal Plan (PSE), hence the strong involvement of Senegalese political decision-makers in the definition and monitoring of this contribution.

Success will also depend on the willingness of all countries involved in the fight against climate change to work in a concerted approach and pooling of resources.